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CHANNEL PILOT.

PART II.

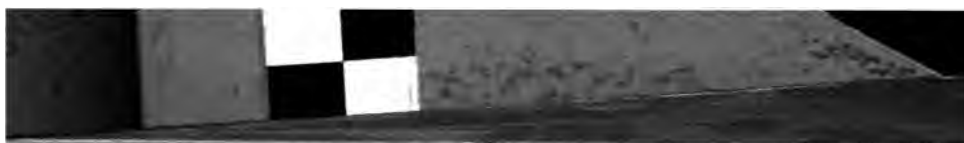
COAST OF FRANCE AND
THE CHANNEL ISLANDS

1882.









Official Copy.

THE
CHANNEL PILOT,
PART II.

COAST OF FRANCE,
AND THE CHANNEL ISLANDS.

ORIGINALLY COMPILED BY
STAFF COMMANDER JOHN W. KING, R.N.

FOURTH EDITION.



PUBLISHED BY ORDER OF THE LORDS COMMISSIONERS OF THE ADMIRALTY.

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1882.

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ADVERTISEMENT

TO

THE FOURTH EDITION.

THE Channel Pilot, Part 2, contains Sailing Directions for the northern coast of France, and the Channel Islands.

The directions for the French coast are compiled from the *Pilote Français*, edited by M. Givry from the valuable surveys made by M. Beautemps-Beaupré, between the years 1836-43; and also from the surveys of Captain Martin White, R.N., in the years 1812-29.

The directions for the Channel Islands were prepared by Staff-Commander John Richards, during the Admiralty survey of those islands in the years 1859-70.

The first edition of this work was compiled by
Staff-Commander J. W. King, in 1859.

The second edition was revised and corrected by the late Staff-Commander G. F. McDougall, in 1870, who embodied the Sailing Directions for the Channel Islands above alluded to.

The present edition has been revised and corrected by Staff-Commander Hitchfield, from various sources, including the most recent charts and other works published by the French Government.

Seamen are invited to transmit to the Secretary of the Admiralty notices of any errors or omissions they may detect in this work, in order that the information may be applied for the benefit of navigation.

F. J. E.

Hydrographic Office, Admiralty, London,
March 1882.



GLOSSARY OF WORDS PECULIAR TO GUERNSEY.

- Amfroques(Amphes roques), called by pilots and fishermen the Humphs.
- AmontUp the stream; Vent d'Amont, northerly, or easterly wind.
- Aval.....Down the stream; Vent d'Aval, southerly, or westerly wind.
- BecA beak; a narrow point of precipitous land jutting out into the sea, as Bec du Nez at Serk.
- BecquetA diminutive of Bec.
- BoueA sunken rock causing an overfall or breaker.
- Col.....A neck; a ridge connecting a rock with the mainland or one rock with another, as Col du Homptol.
- CorbièreHeadlands bearing this name occur in the Channel islands and on the French coast.
- DemiesRocks that uncover at half tide.
- FourquieMeaning forked (a rock with two heads), as Fourquie du Becquet.
- GrèveA beach, as Belle Grève.
- GruneA name frequently applied to rocks which are rather flat on top, as Les Grunes off Jerbourg point, and La Grune off north point of Serk.
- Houmet, or
Hommet. This word is used to describe low islets lying near the shore, and eminences on the land rising in the midst of marshes, as Houmet Paradis, Houmet fort, Houmet mill.
- Kaines.....Denotes long reef of rocks linked as it were together, as Les Boues des Kaines, Les Kaines d'Amont.
- L'EtacA name applied to high isolated rocks, as L'Etac de Serk.
- MoulièreA rock where mussels are found.
- Moye, or
Moie. A steep rocky promontory; occasionally a detached islet, as Pointe La Moye on south coast of Guernsey, and Grande and Petite Moie at Serk.
- PièceA name applied to rocks too small or insignificant to have acquired a distinguishing name.
- Plat(in the feminine platte) signifies flat. Thus Platte roque means flat rock.
- Pleinmontin Jersey Plémont—a bluff headland.
- Tas de Pois....from a supposed resemblance of rocks so named to a stack of peas.

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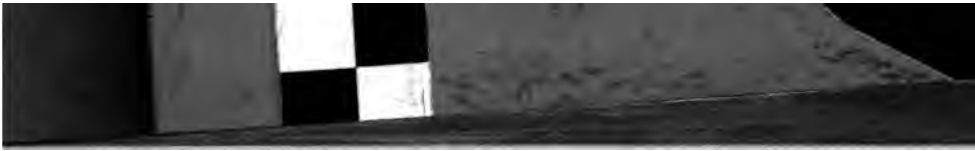
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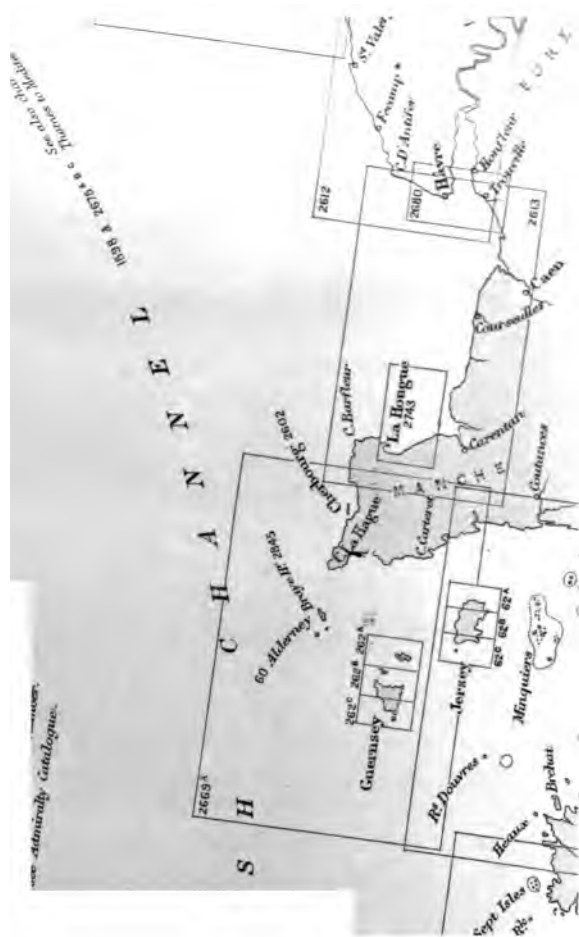
**IN THIS WORK THE BEARINGS ARE ALL MAGNETIC
EXCEPT WHERE MARKED AS TRUE.**

**THE DISTANCES ARE EXPRESSED IN SEA MILES OF
60 TO A DEGREE OF LATITUDE.**

**A CABLE'S LENGTH IS ASSUMED TO BE EQUAL TO 100
FATHOMS.**

**THE SOUNDINGS ARE REDUCED TO LOW WATER OF
ORDINARY SPRING TIDES, EXCEPTING THE
PARTS RELATING TO JERSEY, AND THE CHAUSEY ISLES,
WHERE THE SOUNDINGS ARE
REDUCED TO LOW WATER EQUINOCTIAL SPRINGS**







THE CHANNEL PILOT.

PART II.

COAST OF FRANCE, AND THE CHANNEL ISLANDS.

CHAPTER I.

CAPE DE LA HAGUE TO CAPE BARFLEUR.

VARIATION IN 1882.

Cape de la Hague	-	-	-	19° 0' W.
Cape Barfleur	-	-	-	18° 30' W.

GENERAL OBSERVATIONS.—Having in the Channel Pilot, Part I., described the southern coast of England, from the Lands End to the North Foreland, it is proposed in Part II., to give a description of the northern coast of France, beginning at cape de la Hague (the prominent headland where the channel narrows), and going thence eastward to Dunkerque; then to describe the Channel islands; and returning to cape de la Hague, to proceed thence westward to the isle of Ouessant or Ushant. As in this navigation, which requires great care, it is important that the mariner be acquainted with the general system of winds in the channel, a brief notice of them is prefixed, with the caution that the wind has considerable effect upon the strength and direction of the tidal streams, as well as upon the range of the tides. A notice of the signals established for indicating the depth of water at the entrance of the French ports, and of the system adopted for the colours of buoys and beacons, is also prefixed.

WINDS.—The prevailing winds in the Channel are those from the western quarter, which generally blow during two-thirds of the year. Gales from the westward are felt in all seasons, but from November to March inclusive they are most frequent, and generally last three or four days. Of these a S.W. gale is considered the most dangerous in the

eastern part of the Channel when it is accompanied by rain it blows in violent gusts, and sometimes suddenly changes its direction to N.W., North, and even to N.E. with increasing strength, and causing, in a few hours, a heavy sea upon the French coast to the westward of cape Gris-Nez. If the wind remain fixed in either of the latter points, and its force moderates, the weather becomes fine; but should it back round to the S.W. the bad weather is sure to return. It has been generally remarked that those gales which occur during spring tides are more violent and last longer than those which take place during the neaps, and that it is at the beginning of the flood stream that they acquire their greatest strength.

Gales from North to N.E. are also violent, but they usually last only from 24 to 36 hours, and the wind does not shift as it does with those from the westward. These winds cause a heavy sea on the flood stream, and during their continuance the French coast is covered with a white fog, which has the appearance of smoke. This is also the case with all easterly winds, which are sometimes of long duration, and blow with great force.

Winds from S.E., accompanied by rain, are often violent, and almost always turn into gales, during which the wind in the squalls flies quickly round to N.E., and sometimes to North and N.W., making it dangerous to be upon the French coast when these unexpected changes take place. If it remain fixed in either of the latter points, and moderates in force, the weather is soon re-established, but should it return to the S.E. or South, the bad weather will continue.

Moderate winds from N.W. to N.E. are those which bring fine weather. In the summer the N.E. wind blows more particularly in the afternoon. In the morning there is a light breeze from the S.E., but towards noon it changes to N.E., and freshens; towards the evening it decreases, and at night it is calm, and the cool air condenses the vapours. When this condensation does not take place, it is a sign of a change of wind.

Calms are of rare occurrence, and do not last long, except in summer. When they occur during winter, it is regarded as the precursor of bad weather. The most certain indications of bad weather are, swell in the offing during a calm, and surf on the coast.

The greatest quantity of hail falls during the months of March and April. These hail showers have the inconvenience of causing sudden changes in the direction of the wind, and are consequently dangerous to vessels navigating near the shore.

FOGS are frequent in all parts of the Channel. They form, both on the English and French coasts, in the valleys and on the low marshy lands, whence the winds drive them out to sea. In summer, the heat and the slightest breeze is sufficient to dissipate them, and it is only in the morning that they hide the land; but the moist haze driven in by westerly



winds from the sea, is more tenacious, and only yields to strong winds. This haze is always accompanied by a short sea, and it frequently turns to rain and brings bad weather.

In the eastern part of the Channel, it is rare for the land to be completely free from vapours, unless previous to strong N.E. winds, when it may be distinctly seen from a great distance. The winds from the western quarter, as has been remarked, bring thick clouds, which frequently hide the land; and when it blows strong from the eastward, the vapours which cover the land are dense in proportion as the wind is strong and lasting.

Mirage is frequent during the season of fine weather on the French coast, from the river Somme to cape Alprech. It is considered as an indication of fine weather, when it only tends to enlarge the apparent size of objects; but at all seasons when it distorts them, so as to render them difficult of recognition, it is considered a sign of rain or of strong easterly winds.

WEATHER SIGNALS.—The following local weather signals have been adopted at the principal ports and shipping places on the coasts of France, in addition to the established storm warnings:—

1. A flag, of any colour, indicates—Weather doubtful, barometer inclined to fall.
2. A short pendant (Cornet) „ Appearance of bad weather, heavy sea, barometer falling.
3. A pendant „ Appearance of better weather, barometer rising.
4. A ball above Cornet „ The entrance of the port has become dangerous, be careful.
5. A ball below Cornet „ The lifeboat is coming out.

TIDAL SIGNALS.—The following system of tidal signals was issued in August 1855 by the French minister of commerce and public works, and is now used at most of the ports on the coast of France. The signals are made by balls and flags hoisted on a mast, on which a yard is crossed. The balls are black.

A ball hoisted at the intersection of the mast and yard will denote a depth of 10 feet English, in the channel between the jetties.

Each ball hoisted on the mast beneath the first will denote an additional depth of $3\frac{1}{4}$ feet.

Each ball hoisted above the first will denote an additional depth of $6\frac{1}{2}$ feet.

Each ball hoisted at the left yard-arm (looking from seaward) will denote an additional 10 inches.

Each ball hoisted at the right yard-arm will denote an additional 1 foot 8 inches.

To indicate the state of the tide a white flag with a black cross is used ; also a black pendant. These are hoisted at the mast head immediately there are 6½ feet in the channel, and lowered when the water has receded to the same level. During the flood the pendant will be above the flag ; at high water and during the top of the tide the pendant will be lowered ; and during the ebb the pendant will be below the flag. When the state of the sea is such as to prevent vessels from entering the port, the above signals will be replaced by a red flag hoisted at the mast head.

TABLE OF TIDAL SIGNALS.

9 FT. 10 IN.	10 FT. 8 IN.	11 FT. 6 IN.	12 FT. 4 IN.	13 FT. 2 IN.
14 FT. 0 IN.	14 FT. 10 IN.	15 FT. 8 IN.	16 FT. 6 IN.	17 FT. 4 IN.
18 FT. 0 IN.	18 FT. 10 IN.	19 FT. 8 IN.	20 FT. 6 IN.	21 FT. 4 IN.
22 FT. 8 IN.	22 FT. 0 IN.	23 FT. 10 IN.	24 FT. 8 IN.	25 FT. 6 IN.
RISING TIDE.	HIGH WATER.	FALLING TIDE.		

Danger Signals.—The following danger signals have been established on the coasts in the event of the entrance of a harbour being obstructed by a stranded vessel or by any other accident, viz. :—

By day, a red flag will be hoisted on one of the jetties.

By night, a red light will be exhibited, and in these harbours where a light is established a second light will be exhibited, and both will show a red light.

BUOYS and BEACONS.—A uniform system of colouring all buoys and beacons is observed on the French coast. In entering a port,



buoys and beacons painted red must be left to starboard, and those painted black to port. The beacons below the level of high water, and all warping buoys are painted white. The small rocky heads in the frequented channels are painted in the same manner as the beacons, when they have a conspicuous surface.

Every buoy or beacon bears in full length, or abbreviated characters, the name of the shoal or rock which it is meant to distinguish, and also its number, showing its numerical order in the same channel. These numbers commence from seaward; the even numbers on the red buoys and the odd numbers on the black buoys.

The letters and numbers are painted white on the most conspicuous parts of the buoys, and from ten to twelve inches in length. The masts of the beacons which do not present sufficient surface are surmounted for this purpose by a small board. All the jetty heads and turrets are painted above the half tide level, and on the former a scale of metres is marked commencing from the same level.

CAPE de la HAGUE, the north-western extreme of Normandy, is low and sandy, but the coast at the distance of 3 miles to the S.S.W. suddenly rises, about 320 feet above the level of the sea, into a high bluff promontory called Nez-de-Jobourg, which may be seen in clear weather from the distance of 24 miles. On the top of the promontory is a small hummock, the slopes of which extend to the almost perpendicular cliffs on its western side.*

The most conspicuous objects in the vicinity of cape de la Hague are, the lighthouse on the summit of the Gros du Raz rock, bearing W. $\frac{1}{2}$ S. half a mile from the cape; the tower of Jobourg church, standing at the distance of $1\frac{1}{4}$ miles East from the Nez; the village of Auderville, the church of which has a small tower, not very visible; and the church of St. Germain de Vaux, with its square tower surmounted by a spire.

LIGHT.—The lighthouse on Gros du Raz, the largest rock in the vicinity of cape de la Hague, exhibits at an elevation of 154 feet above high water a *fixed* white light, which possesses the advantage of being rarely obscured by the fogs from the land, and as seldom by the mists from the sea. The light is of the first order, and visible in clear weather from a distance of 18 miles.

DANGERS off CAPE de la HAGUE.—The coast around cape de la Hague, from $1\frac{1}{2}$ miles southward of the Gros du Raz rock to the Houffet rocks, is skirted by many dangers, which are rendered formidable by the great violence of the tides in their vicinity. The local pilot, under

* See Admiralty Charts:—British islands to Mediterranean Sea, No. 1; scale, $m = 0.02$ of an inch; English channel, No. 1,598; scale, $m = 0.1$ of an inch; Channel islands, northern portion, and adjacent coast of France, No. 2,669A; scale, $m = 0.5$ of an inch.

favourable circumstances, will sometimes take vessels under 15 feet draught, along the shore within the rocks which are detached from the beach, for during fine weather the tides are less rapid and the sea less disturbed there than in the wide channel of the Alderney Race. No vessel, however, should attempt this passage without an experienced pilot.

The principal dangers in the vicinity of the cape are, the Greniquet, Diotret, Foraine, Noires, Grunes, Becque, Ronde, and the Houffet rocks.

Le Greniquet, the summit of which is 5 feet above high-water springs, lies 3 cables from the shore, abreast Calenfrien, and S.S.W. a mile from the lighthouse on the Gros du Raz.

Le Diotret bears N.N.E. $3\frac{1}{2}$ cables from the Greniquet, and its summit, which is $26\frac{1}{2}$ feet above low water, is covered at high equinoctial tides.

La Foraine, the westernmost rock in the vicinity of the cape, situated nearly a mile from the shore, and W. $\frac{3}{4}$ S. three-quarters of a mile from the lighthouse on the Gros du Raz, is of a conical form, uncovers 14 feet at the lowest tides, and is considered a half-tide rock, and a valuable mark, because as soon as it is covered the stream of flood begins to be felt in the Race of Alderney, and the stream of ebb directly it uncovers; this rock is, however, extremely dangerous to vessels passing in its vicinity, on account of the streams setting directly over it. The steeple of Les Pieux church, standing on the high land to the eastward of cape Flamanville, in one with the large rock forming the extremity of the Nez-de-Jobourg, leads 3 cables westward of the Foraine; but this church will not be visible except in very clear weather.

Buoy.—An automatic whistle buoy, painted red, is moored with Foraine rock bearing S. 1° E. distant about 3 cables, and cape de la Hague lighthouse S. 81° E. distant about 8 cables.

Les Noires.—The space to the north-east of the Foraine, between it and the Gros du Raz, is filled up with shoals and the rocks called the Noires, the highest of which lies midway between the lighthouse and the Foraine, and uncovers 21 feet. A sunken rock named the Galet, with only one foot water, lies N.N.E. $\frac{1}{4}$ E. half a mile from the lighthouse.

La Grande Grune, a dangerous rocky reef, on the shoalest part of which there are only 2 feet water, lies N.E. $\frac{3}{4}$ N. about three-quarters of a mile from the lighthouse, and half a mile from the shore. The lighthouse in line with the pitch of the cliff of the Nez-de-Jobourg leads a quarter of a mile westward of the reef.

La Petite Grune.—This reef, about a quarter of a mile in length N.E. and S.W. has on its middle two rocky heads which uncover about a



foot. It lies E.S.E. $3\frac{1}{2}$ cables from the Grande Grune, and about half a mile from the shore, and the sea breaks with great fury during a weather tide, both upon it and the Grande Grune. The north-eastern extreme of the Houffet rocks in one with the Esquina rock (this rock lies near the eastern shore of St. Martin bay, and is the largest and highest rock of all those which lie near the coast between cape de la Hague and Omonville) bearing S.E. $\frac{1}{4}$ E. will lead a cable to the northward of the northern head.

La Becchue, a large rock, lying about 4 cables from the shore and E. $\frac{3}{4}$ N. $1\frac{1}{4}$ miles from the lighthouse, is the northernmost of all the rocks which do not cover between the lighthouse and St. Martin bay, and its summit rises 4 feet above high-water springs. At low water a number of rocky heads appear in a circuit of a quarter of a mile around the Becchue; the westernmost of these heads, which uncovers 4 feet and is named the Porchet, lies about midway between the Becchue and Petit Grune.

La Ronde, lying N.E. $\frac{3}{4}$ N. 2 cables from the Becchue, uncovers 5 feet at the lowest tides, and is in the shape of an oven. At 4 cables S.E. by E. of the Becchue is the outer extreme of the Houffet rocks, upon which there are several heads that are uncovered 3 or 4 feet above high-water springs.

GOURY.—This grounding place, on a beach of pebbles and gravel at the head of a small elbow in the shore, lies about half a mile to the southward of the lighthouse on the Gros du Raz, and is sheltered from the land winds from N.N.W., round North and East, to S.S.W. It was also protected from the great swell which sometimes rolls in from the westward by a short stone jetty and the rocks upon which it was built; but it is now abandoned in consequence of a greater part of the jetty having been thrown down, and there being at times a heavy surf behind what remains standing.

The entrance to this harbour bears E. $\frac{1}{4}$ N. 3 cables from Diotret rock, and is formed between two large rocks joining the shore; the rock on the south side, named Jet d'Amont, is awash at high-water neaps, and that on the north side, Jet d'Aval, is about 2 feet above that level. The harbour dries 11 or 12 feet above the lowest tides, and there are 10 to 15 feet water in it at high-water springs, and 6 to 7 feet at neaps, but it is inaccessible during strong N.W. or S.W. winds, on account of the heavy sea; and in every case, since it can only be entered at the time of high water on the shore, that is when the stream is at its greatest speed in the Race of Alderney, the approach to it must always be difficult and often dangerous, and no vessel should attempt it without a local pilot.

Tides.—It is high water, full and change, in Goury harbour, at 7h. 6m.; springs rise 22 feet, neaps $17\frac{1}{4}$ feet.

A Life Boat is stationed at Goury.

Directions.—When approaching cape de la Hague from the westward, it should be borne in mind that the north-eastern stream of tide, between the period of half flood and half ebb on the shore, sets very strongly round the cape. Flamanville church tower, however, seen exactly half way in the interval which separates the Nez-de-Jobourg and cape Flamanville, S. $\frac{1}{2}$ E., will lead a sufficient distance to the westward of the cape so as to have nothing to fear from being drawn by the stream, whether flood or ebb, amongst the rocks in its vicinity.

Vessels coming from the eastward, and coasting a little too near the shore between Cherbourg and cape de la Hague, are liable to be drawn into the Race of Alderney if they do not keep 7 or 8 miles from the coast when to the westward of Cherbourg. The Race may also be avoided by keeping one or 2 miles north of the two windmills on Alderney seen in line, because it is nearly in that direction that the separation of the streams of ebb, that which runs towards the Race, and that which passes north of Alderney, takes place. In clear weather, these windmills may be seen from the masthead from abreast of St. Martin bay. If overtaken by a calm they should anchor if within 7 or 8 miles of the land. The pilots recommend a position in about 20 fathoms water, a little to the northward or north-eastward of the Mermistin rock, which lies about a mile from the shore, between Omonville and Querqueville point.

FOSSE de la HAGUE.—The soundings around cape de la Hague are very irregular, from whence proceed the violent eddies in its vicinity, which are caused by the great mass of water flowing towards the cape during the north-eastern stream. At 3 miles W. by N. $\frac{1}{2}$ N. from the lighthouse on the Gros du Raz, commences the southern part of the Deep, named the Fosse de la Hague, which from thence trends to the north-eastward, and terminates at $3\frac{1}{2}$ miles from the coast on the meridian of the eastern part of St. Martin bay. The soundings throughout the whole extent of the deep are from 36 to 58 fathoms, and there are 30 fathoms around it.

ANSE de St. MARTIN.—This bay lies 2 miles to the eastward of cape de la Hague, and is bounded on the eastern side by the high rocks of Martiauroc and Esquina, and on the western by the Herbeuses. It is open to winds from N.W. to N.E., which throw in a heavy sea when they blow with any strength, but it is well sheltered from all other winds, especially those from the opposite quarter.

The western point of the bay is the termination of a projecting range of hills, on the top of which stands the church of St. Germain de Vaux, and may be easily known by the Herbeuses rocks, which form a sort of pro-



longation of it, as well as by a fort commanding the approach to a tolerably good anchorage to the E.S.E. and S.E. of the point, where small craft find shelter from winds between W.N.W., round westerly, and S.S.E., but where they would be greatly exposed if it should blow strong from the north-eastward. The Herbeuses are large rocks rising from 30 to 40 feet above high-water springs, and are joined to the western point of the bay by rocks which uncover, and which extend N.N.E. 3 cables in a direct line from that point. The ground is foul around the Herbeuses, and shoal patches with only one to 3 feet water on them, lie N.E., E.S.E., and S.S.E. $1\frac{1}{2}$ cables from their northern extremity. A red buoy is moored on the N.E. extreme of these patches.

The western shore of the bay is precipitous, and bordered by rocks which uncover at low water; but in its south-west angle, at the entrance of the valley of St. Germain de Vaux, there is a small beach of pebbles and gravel which covers at the first half-hour's flood. A similar beach forms the head of the bay, and halfway up the hill, behind the beach, stands the church and village of St. Martin. The eastern shore of the bay is low, but the adjoining land rises gently to the top of a spur of hills running out towards Jardeheu point, and separating the rivulet which passes St. Martin, from that which empties itself into Omonville harbour.

From the middle of the beach at the head of St. Martin bay to Jardeheu point the shore is bordered by rocks which dry at low water; outside these rocks are others lying in separate groups, the most remarkable of which are the Martiauroc and the Esquina; the former is covered only at great springs, but the latter is one of the largest rocks in the bay, and has two heads very near each other, one of which rises 30 feet above the highest tides. Several ledges, some of which uncover, extend half a mile to the north-west of the Martiauroc, and form a sort of causeway terminated by a rock with only 3 feet water on it, called the Parmentière, which is marked by a black buoy on its western edge. The opening into the bay is about three-quarters of a mile wide between the Herbeuses and the Martiauroc, but the only channel by which vessels can enter, and get up to the anchorage under the fort without a pilot, is barely a quarter of a mile wide, and is formed between the above 3-foot rock and the ledges lying to the eastward of the Herbeuses.

Basse du Houffet and Le Fliart.—From the Houffet rocks to the western point of St. Martin bay the coast is bordered by irregular rocks which uncover at low water, and off it there are many shallow patches. The Basse du Houffet, the farthest out, is dangerous only on account of the high sea on it occasioned by the eddies; it lies E. by S. $\frac{1}{2}$ S. 6 cables from the Houffet rocks, and has $5\frac{1}{2}$ fathoms water on it. The Fliart, lying N.N.W. 2 cables from the Herbeuses, is the principal rock of those which

uncover along this part of the coast ; its summit drying 11 feet above the level of the lowest tides. Shoal patches extend E. by N. 3 cables from the Fliart, and upon their outer extremity there are only 6 feet water. A red buoy is moored on the outer extreme.

POINTE JARDEHEU is a small round hill covered with herbage, and separated from the hills inland by a narrow isthmus which covers at high tides ; upon its summit there is a mass of large rocks, and it may be easily recognised when bearing S.E. or N.W. The point is surrounded by rocks and shoals, which extend 6 cables to the northward. The largest and most remarkable of these rocks, named the Coque, lies East 3 cables from the point, and rises 3 feet above the highest tides. A rocky ledge called the Hures de la Coque, extends N.N.E. 3 cables from the Coque, where the depth is only $5\frac{1}{2}$ fathoms, and causes violent eddies, which small vessels must be careful to avoid. It may be important to know that when one of the rocks on this ledge covers (it lies N.N.E. $\frac{1}{2}$ E. a cable from the Coque, and uncovers 10 feet at the lowest tides) which is near the time of half flood on the shore, the flood stream is running as far out as $2\frac{1}{2}$ or 3 miles from the shore between Omonville and Cherbourg.

Basse Brefort, on which there is only a depth of $2\frac{1}{2}$ feet, lies N. by E. $\frac{1}{2}$ E. half a mile from Jardeheu point, and the same distance N.N.W. $\frac{3}{4}$ W. from the Coque. The marks for this shoal, which is dangerous to coasters, are, the summit of Esquina rock, in line with a village situated half-way up the hill to the westward of Jobourg church tower, and the Coque entirely concealing a large rock named the Foireuse, which lies S.S.E. $\frac{2}{3}$ E. from it.

TIDAL STREAMS.—The sudden change in the direction of the flood or north-east stream after doubling cape de la Hague occasions to the north-east and east of that cape a great eddy, which extends even beyond Omonville, and runs along the coast, following a direction opposed to the stream in the offing, for nearly 9 hours, that is, from $2\frac{1}{2}$ hours before, until $6\frac{1}{2}$ hours after the time of high water on the shore.

This eddy begins to form at the opening of St. Martin bay about half an hour after the flood stream has commenced in Alderney Race, and its speed increases with that stream ; but as it runs to the N.W., and when near the Becchue rock, it comes in almost direct opposition to the tide flowing East and E.S.E. out of the Race, causing a cross sea, which is violent in proportion to the rate of the flowing tide. Towards the time of high water in St. Martin bay, that is, a quarter of an hour after that at Goury, or a quarter of an hour before that at Omonville, when the stream is at its greatest strength, this confused sea extends nearly $2\frac{1}{2}$ miles from the shore, to the line on which Jobourg church-tower is seen in one with



the Herbeuses rocks. The violence of the sea decreases in proportion to the speed of the flood stream, and totally ends about a quarter of an hour before the ebb stream begins in the Race.

A similar cross sea takes place around Jardeheu point from the meeting of the eddy which runs to the north-west along the shore at Omonville, with the stream of flood which comes from the W.N.W. between the Esquina rock and the Bréfort shoal. This confused sea is also violent, and extends into the offing as far as the line on which Jalletin guard-house is seen in one with the lighthouse on the Gros du Raz. It commences at the same time as that which takes place near the Becchue, but it ends 15 or 20 minutes before high water at Omonville; as soon as it ceases the counter stream or eddy runs round Jardeheu point, and extends without interruption from Omonville to the Houffet rocks.

La FOIREUSE, a rock lying midway between the Coque rock and Omonville harbour, is close to the outer edge of a rocky flat which runs 2 cables off the intermediate low shore, and its rounded summit is 2 feet above the level of the highest tides. A rocky ledge extends half a mile to the eastward of the Foireuse, and its eastern extremity, on which there are only 4 fathoms water, rises suddenly from soundings of from 17 to 23 fathoms, and lies in the direction of the church-tower at Digulleville seen a quarter of a point open to the southward of the church-tower at Omonville, bearing W. by S. $\frac{3}{4}$ S. The highest rocks on this ledge uncover 8 feet at low water.

PORT D'OMONVILLE.—This small harbour lies in a slight indentation of the coast one mile to the south-eastward of Jardeheu point, and is well sheltered from N.N.W., round westerly, to S.E.; but with strong winds between North and East it is only completely sheltered whilst the rocky ledge which joins the land on its northern side remains uncovered. At neap tides the highest rocks of this ledge break the waves, and the swell only enters the harbour; but during high springs, when all the rocks are covered, there is much sea in it. The position of the harbour may be easily recognised from a distance by the village of Omonville, which is situated at the bottom of a valley, the slopes of which are covered with cultivation; by a large fort erected on the eastern point of the indentation; by an old semaphore called the Vigie, on the top of the hill, at the foot of which stands the fort; and by a large mass of rock on the summit of the hill bounding the valley to the north.

The harbour is only 2 cables long from east to west, and barely a cable wide in the space where vessels may anchor between the rocks. The depths increase gradually from the beach on its western shore to 7 fathoms at the entrance. In the deepest part of the harbour the soundings vary from

5 to 7 fathoms over a rocky bottom, in the cavities of which are deposits of stiff yellow mud, where anchors hold firmly; but as these deposits are of small extent, it is probable that the anchors take hold in the fissures of the rocks.

A Life Boat is stationed at this port.

Directions.—Some precaution is necessary when standing for Omonville harbour with light winds from S.W. or S.E., or during calms after half-flood, so as not to miss the entrance. Under these circumstances a vessel should be in a position to the S.E. or S.S.E. of the entrance, so as to have the eddy, which runs $2\frac{1}{2}$ knots at springs, (noticed at page 10,) favourable for entering. With all other winds, when they are sufficiently strong to ensure stemming the stream, a vessel may run directly for the entrance, taking care, when rounding the rocky ledge, which extends half a mile to the eastward of the Foireuse rock, to have Digulleville church-tower half a point open to the southward of the church-tower at Omonville. The pilots affirm that it is possible to enter the harbour, whatever may be the state of the sea, if a vessel can carry sufficient sail to ensure good steering. There is no difficulty in leaving except with a strong easterly wind.

Tides.—It is high water, full and change, in Omonville harbour at 7h. 29m.; springs rise $15\frac{1}{4}$ feet; neaps $12\frac{1}{4}$ feet.

The COAST from Omonville trends to the south-east for 6 miles to Querqueville point. From half a mile from Omonville to within three-quarters of a mile of Urville church it is high and precipitous, intersected by deep valleys, and terminates in perpendicular cliffs of grey rock, with no remarkable object on it except a peak of rock resembling a wall in ruins, and named Castel Vendon. At half a mile S.S.E. from Omonville fort a rocky ledge runs out about a quarter of a mile from the shore, and with this exception the coast from Omonville to the east end of the cliffs is bold to at any time of tide, as the rocks bordering it do not extend more than half a cable from the shore.

POINTE de QUERQUEVILLE.—At three-quarters of a mile to the westward of Urville church, the hills take a south-east direction and leave between their last slopes and the shore a low narrow plain, which terminates to the eastward at Querqueville point, distinguished by a fort pierced for 76 guns, and a light tower.

The shore along this low part of the coast is bordered by a beach of sand, gravel, and rocks, which uncovers at low water, and in several places extends as far out as 3 or 4 cables from the land. Outside the beach there is a rocky bank, with irregular depths on it, extending nearly a mile outside high-water mark.



The north-west part of this bank, Raz de Bannes, lies between the bearings of North and N.E. from Urville church tower, and many of the rocks on it uncover; the highest rock dries $4\frac{1}{2}$ feet at the lowest tides, and N.W., half a mile from it, and at the north-west extremity of the bank lies a small shoal patch, on which there are only 5 feet water.

A beacon tower has been erected on Raz de Bannes, situated about $5\frac{1}{2}$ miles westward of Cherbourg.

The tower has an elevation of 10 feet above high water springs, is painted red with a white top, and surmounted by a mast with an iron ball.

This beacon forms a valuable landmark for vessels approaching Cherbourg from the westward in thick weather.

The north-east part, named the Plateau de Nacqueville, the eastern extremity of which is in line with the western part of the Redoute des Couplets (the redoubt stands on the summit of a hill south of St. Anne bay) and the outer wall of the circular battery of Querqueville fort; large vessels should avoid crossing the plateau at low water, as the tide causes much rippling on it, and a small 9 feet patch lies $3\frac{1}{2}$ cables from the shore.

A Life Boat is stationed at Querqueville point.

Le Mermistin, a rocky flat lying E.S.E. 2 miles from Omonville, and a mile from the cliffs of Castel Vendon, is about $3\frac{1}{2}$ cables long, east and west, and $2\frac{1}{2}$ cables broad, with 6 to 7 fathoms water, and 10 to 15 fathoms close around; from its eastern end Urville and Nacqueville church-towers are in line bearing S. by E.

Anchorage.—A vessel, waiting a favourable time to enter Cherbourg road, can anchor between the Plateau de Nacqueville and Querqueville point in $7\frac{1}{2}$ fathoms water, over good holding ground of muddy sand. The best position is with the light-tower in fort Imperial on Pelée island, in line with the light-tower in fort Central on Cherbourg break-water, bearing S.E. by E. $\frac{1}{2}$ E. easterly, and the guard-house at Roule fort seen a little within the circular battery at Querqueville fort, S.S.E. $\frac{1}{2}$ E.

Tides.—One cable to the northward of the Mermistin flat the stream of flood begins 3h. 45m. before the time of high water at Cherbourg, and sets to the southward at the rate of a knot an hour; from 2 to 3 hours before high water at that place it runs S.E., with a velocity of from $3\frac{1}{2}$ to 4 knots, when its direction changes again to the southward. One hour after high water it runs S.S.W., but its rate does not exceed a knot, and as its strength decreases, the direction of the stream assumes a more westerly direction, and it finally ends about 2 hours after high water at Cherbourg.

The direction of the ebb-stream varies only from West to N.W. from the time of its commencement until $4\frac{1}{2}$ hours after high water at Cherbourg,

but as its speed decreases, it turns successively to all the points between N.W. and West, where it ends 3h. 45m. before high water. Its greatest velocity, about $3\frac{1}{2}$ knots, occurs from 4 to 5 hours after high water at Cherbourg. The Mermistin lies at the eastern limit of the great eddy noticed in page 10.

At 3 or 4 miles to the northward of the Mermistin and of Querqueville point the flood stream begins 3 hours before the time of high water at Cherbourg, and ends about 3 hours after high water at that place. Generally speaking, at that distance from the coast, eastward of the Mermistin, and also in the middle of the English Channel, the changes of the tide-streams take place at the times of half-flood and half-ebb at Cherbourg.

PORT de CHERBOURG.* — Cherbourg is a sea-port town, naval station, extensive arsenal, and fortress of the first-class. The town stands at the mouth of the river Divette, and has some trade. Steamers run twice a week to Le Havre, and a railroad was opened in August, 1858, which brings Paris within 9 hours distance. It is in communication by electric telegraph with Paris, Le Havre, St. Malo, Brest, Toulon, and the chief towns in France.

RADE de CHERBOURG is comprised in the space formed between Querqueville point and Pelée island, which lie E.S.E. and W.N.W. of each other, distant $3\frac{1}{2}$ miles. The road is sheltered on its northern side by a breakwater, and its southern limits are the shores of St. Anne and Cherbourg bays. The area of the sheltered portion of the roadstead, of 3 fathoms depth and upwards, is about 1,650 acres; of 4 fathoms and upwards, 1,350 acres; of 5 fathoms and upwards, 900 acres. The quieting effect of the breakwater upon the roadstead is very sensible, and vessels now ride in safety, and remain during the winter where formerly they dared not anchor.

La DIGUE or BREAKWATER is a magnificent artificial structure which rises from a depth of from 6 to 7 fathoms at low water, and shelters the roadstead from N.W., round northerly, to N.E. It is formed by a mound of rubblestone deposited à pierre perdue up to the level of low water of equinoctial spring tides. It is 4,060 yards in length, and its base about 100 yards wide, having a long foreshore to seaward; on the harbour side it stands at an angle of 45° . Upon this foundation is built a wall of masonry, nearly vertical, 33 feet wide at the base, diminishing to 27 feet at the top, which, with the parapet, rises 23 feet above the level of high-water springs.

* See Admiralty plan of port de Cherbourg, No. 2,602; scale, $m = 6$ inches.



The breakwater does not extend in a straight line, but has two arms of unequal length, diverging 5° each towards the harbour. The western arm is about one-third longer than the eastern. The work was begun in the year 1783, but was several times interrupted, and was brought to a close in 1853. The chief engineers employed on it were De Cessart, De Lamblardie, Cachin, Fauques-Duparc, Virla, Bonnin, and Reibell, and they have constructed a work of which France may be justly proud. It is defended by a fort in the centre, one at each end, and by an intermediate battery on the western arm. A large white buoy marks the western extreme of the foundation of the breakwater, and a red buoy the eastern extreme.*

A Life Boat is stationed at the west end of the breakwater.

LIGHTS.—The approaches to Cherbourg are facilitated at night by three lights, dioptric and of the 4th order. The first is a *fixed* white light placed in a white tower in Querqueville fort at 59 feet above high water. The second is a *fixed* white light, with a *flash every three minutes*, exhibited at 66 feet above high water, from a small stone tower, painted white, which stands in fort Central on the breakwater, and which bears from the former light E. by S. $\frac{1}{4}$ S. southerly $2\frac{1}{2}$ miles. The third is a *fixed* white light placed on the north-east bastion of fort Imperial on Pelée island, at 85 feet above high water; it bears from the *flashing* light on fort Central S.E. by E. $\frac{1}{2}$ E. easterly $1\frac{1}{3}$ miles. All three lights may be seen in clear weather from a distance of 9 to 10 miles.

A *fixed red* light 62 feet high, marks the western head of the breakwater, and is visible 7 miles; and a *fixed green* light the eastern head, visible 4 miles.

A *fixed red* light is shown at 33 feet above high water, from a stone tower, painted white, standing at the end of the east jetty of the port du Commerce, visible about 6 miles; and a *fixed green* light elevated 15 feet above the level of high water, is exhibited from the head of the west jetty visible 2 miles.

ANSE de St. ANNE or St. Anne bay, is 2 miles wide from Querqueville point to Homet fort, and its shore, on which stands a battery

* The first idea of sheltering Cherbourg bay by an artificial work dates as far back as 1665; but the first real project was in 1775, by M. de la Bretonnière, Capitaine de Vaisseau. In 1781 the proposal of M. de Cessart, engineer, to form a breakwater by sinking frustra of cones filled with stone was adopted, and the first cone was sunk in 1784. After 18 such cones had been sunk this plan was abandoned in 1788, and that of depositing stone *à pierre perdue* was adopted and followed up, with occasional intervals, until the breakwater reached above high water, but as in that form it could not withstand the force of the sea, M. Fouques-Duparc proposed, in 1829, a vertical wall of masonry based upon the rubble foundation rising from the level of low water of equinoctial spring tides. Such a wall was begun in 1832 and carried on to completion at the close of 1853. Since then the forts have been in progress. The whole cost of the breakwater has been 2,674,491*l.*, or at the rate of 220*l.* a lineal foot, measured from end to end of the foot of the embankment.—Bonnin, *Sur l'Achèvement de la Digue de Cherbourg*. Paris, 1857.

mounting 16 guns, is low and almost entirely bordered by rocks which uncover at low water. The farthest out of these is a large rock named the Rochefort, lying at the head of the bay about 2 cables from high-water mark and a mile to the south-eastward of Querqueville fort, and its summit rises 2 feet above the level of the highest tides.

The water is not deep in this bay, and in some parts there are only $4\frac{1}{2}$ fathoms at low water at half a mile from the shore. Not more than 17 feet will be found at the extremity of a rocky projection which extends $3\frac{1}{2}$ cables to the eastward from the outer wall of the circular battery on Querqueville point, and only 12 feet at the distance of 4 cables to the south-east from the same part of the fort.

A rocky head, upon which there are 12 feet water, lies E.N.E. half a mile from the Rochefort rock, with the summit of that rock nearly in one with Henneville church-tower, and N.W. westerly 9 cables from Homet fort. This 12-foot rock is much in the way of large vessels beating in or out of Cherbourg road, and should be avoided at the springs from a third-ebb to two-thirds flood, and at all times of tide during neaps. A heavy swell is thrown on the beach of the bay when the wind is strong from N.W. or N.E., and it would be dangerous then to anchor in it, as the bottom is uneven and covered with rocks.

Basse Chavagnac, a small rocky patch with a fort on it lying at the entrance of St. Anne bay, midway between the circular battery of Querqueville fort and the west end of the breakwater, is about three-quarters of a cable long and from 50 to 60 yards broad. The patch breaks with strong gales between N.W. and N.E. and during a weather tide the sea is much agitated on it; it is dangerous to approach in calm weather, as the ebb sets directly over it.

BAIE de CHERBOURG is bounded on its western side by the rocks off Homet fort, and on its eastern side by the Flamands rocks and Pelée island. The town of Cherbourg and the port du Commerce occupy the head of the bay, and the establishments of the port Militaire the western side, between the town and Homet fort. The shore is low from the front of the town to the Flamands, and bordered by a sandy beach a quarter of a mile broad at low water.

The low land adjoining the shore of this bay extends but little into the interior, and is bounded by the high hills, between which are the valleys of Roule and Tourlaville. The entrance to Roule valley is south of the floating basin of the port du Commerce, and between two hills of unequal height. The eastern hill, Mont Roule, is steep and crowned by Roule fort, which commands all the neighbourhood. A telegraph is placed on the top of the western hill. Tourlaville valley is situated to the eastward of Roule valley, and is only separated from the former by a range of hills, of which



Mont Roule forms the north-western extremity. The entrance to this valley is wide, but it rapidly narrows farther inland.

Roches des Flamands lie close to the eastern shore of Cherbourg bay, and their highest parts uncover at low water. A strong fort is erected on these rocks mounting 70 guns in two tiers, and is approached from the shore by a causeway and drawbridge. The Basse des Flamands, upon which there are only 7 to 12 feet water, lies to the northward of the rocks, at half a mile from the shore, and is separated from them by a sandy bottom. The mark for this shoal, as well as for the north-west point of the Flamands rocks, where there are only 15 feet water, is the house on the small redoubt of Octeville seen between the two towers of Cherbourg church, bearing W.S.W. Vessels must avoid the rocky patches (noticed in page 21) in the bay when intending to anchor.

Port d'Echouage.—At the eastern side of Flamands fort there is a small harbour used by vessels, of not more than 300 tons burthen, which convey timber for the use of the dockyard. A canal has been constructed from this harbour eastward to the Mare de Tourlaville, 50 acres in extent, where a very large supply of building timber is preserved.

La Tenarde is a rocky ledge with three dangerous heads upon it, lying N.E. 2 cables from Homet fort, and occupies a space one cable long from east to west, and half a cable broad; at low water there are 14 feet on the western head, 6 feet on the middle head, and 9 feet on the eastern head. The eastern head lies at the eastern extremity of the shoal, N.E. by E., nearly 2 cables from the flagstaff on Homet fort, with Nacqueville church-tower in line with the smallest tower of Querqueville church, bearing N.W. by W. $\frac{3}{4}$ W., and the top of the group of trees surrounding Fief farm, which stands half a mile to the south-east of Roule fort, in line with the end of the western jetty of the port du Commerce, S. $\frac{1}{2}$ E. The small church tower at Querqueville kept exactly between the tall spire of that church and the tower of Nacqueville church leads a quarter of a cable to the northward of the dangerous parts of the Tenarde. The eastern end of the shoal is marked by a buoy, moored N.E. by E. $\frac{3}{4}$ E. half a cable from the eastern head. There are from 19 to 21 feet water over rocky bottom between the Tenarde and the shore, with the exception of a 13-feet patch lying E. $\frac{1}{2}$ S. 2 cables from the flagstaff of the fort.

Port du Commerce or Mercantile harbour consists of an Avant-port or outer harbour with the channel leading to it, and a Bassin de Flot or floating basin, occupying the place of the former mouth of the little river Divette, which waters Roule valley. The channel, the bottom of which is composed of a mixture of sand, mud, gravel, and shingle, and dries at low-water equinoctial springs, lies between two stone jetties running parallel

the channel at low water. Its eastern side, enclosed, is exclusively appropriated to Government and western quays, which extend 500 yards for the mooring of merchant vessels. The bottom of the harbour is hard, and the repairing slip, and about half-way along the western side the rock is exposed, it consists of a mixture of sand, gravel, and shells. The bottom at the foot of the quays is level, and dries at the level of the lowest tides, and vessels would lie here if not exposed to the heavy swell and surf which sets in when the wind blows between West and North. To remedy this, a pier has been built in a line perpendicular to the western quays, extending southward of the new repairing slip, and the swell which breaks in a great measure on the slip and in the approach to the pier and the western jetty; but, under all circumstances, it is not longer in the outer harbour than is necessary for such a floating basin. Warping buoys are placed in the channel for the convenience of vessels going into the basin, and the depth over which they have to pass is about $1\frac{1}{2}$ feet above the lowest tides.

The Bassin de Flot is 440 yards long and 137 yards wide, and contains an area of 12 acres, or space for about 240 small vessels if the weather may oblige them to seek refuge in Cherbourg. It communicates with the outer harbour by gates 42 feet wide, and 15 feet above their sill (which is 15 inches above the level of the sea). The water is 19 to 21 feet at great springs, 17 to $18\frac{1}{2}$ feet at ordinary springs, and out 13 feet at neaps. The gates remain open about 12 hours, and are closed with a falling tide. There are two basins at the head of the basin.



naval dockyard; it is surrounded on both the land and the north sides by a fortified enclosure; Homet fort being its principal defence towards the sea.

The Port, properly so called, consists of three extensive floating basins. The outer basin or Avant-port, of 16 acres, communicates with the roadstead by a short channel opening to the eastward, in which there are from 13 to 16 feet at low water; and with the Bassin de Flot, or northern basin, (15 acres) by gates 59 feet wide, having their sill $13\frac{1}{2}$ feet below the level of the lowest tides. Both basins have been formed in the solid rock to a depth of about 32 feet below the same level.

Before the eastern arm of the digue or breakwater was raised above the level of high-water springs, the southern basin was untenable with strong winds from E.N.E. to E.S.E., but now the surf is much less violent. An inner floating basin named Bassin Napoléon III., of 20 acres in extent, was opened in August 1858. It has 7 first-class building slips, and one dry dock on its west side, 4 docks on the north, and 2 double docks on the south side. There are also 4 building slips on the south side of the Avant-port, making 11 in all and 7 docks. The quays and docks are faced with fine granite from Diélette, Flamanville, and Chausey. On the north side, surrounding the docks, are the steam factory and workshops for repairing vessels.

Time signal.—The signal is made by a disc on a mast at the Marine Observatory, Vigie des Onglet, Quay Napoleon; the disc is placed vertically a short time before signal, and falls into an horizontal position at noon, Paris mean time. When not in use, disc is inclined at an angle of 45° .

ILE PELÉE is the remainder of a long point which extended nearly $1\frac{1}{2}$ miles to the northward from the coast, but which has been separated from it by the action of the waves, leaving a channel nearly half a mile wide. This island is a flat of bare rock, nearly covered by the waves at high water; but at low-water springs it is about three-quarters of a mile long from north to south, and half a mile broad, presenting the form of a horseshoe, with its opening [facing east; its highest point is a heap of stones awash at high-water great springs. Fort Impérial stands on the western point of the island, and defends the eastern entrance to Cherbourg road. The south-western bastion of the fort has a flagstaff on it, and a *fixed* white light is exhibited from the north-eastern bastion; both bastions being sufficiently high to be seen at the distance of 10 or 12 miles from seaward. The north-west and north-east extremes of the island are marked by beacon towers.

DANGERS on ILE PELÉE FLAT.—The principal dangers which do not uncover upon the rocky flat forming the base of Pelée island are, the Basse du Chenal, the Basse de Happetout, the North-west point of the flat, and the Truite rock.

Point de Happetou, a small is-
land, is situated in the eastern channel
between the Long Mureaux & the flat from the
eastern point of Honnet fort, just open to
the view of Fort Impérial and the small houses
of the barrack at the **Parquet de Dancerville**,
standing on the height above the line
of the cliff. A little to the westward of the
line with 2 fathoms on it.

The rocky flat of Pelie island extends 2 cable
from the north side of the island, and as the sea
it, and the soundings vary from 9 to 23 feet, it will
to avoid approaching too near its northern edge,
keeping the spire of Querqueville church well
Central.

The North-west Point of the Flat has
water, but at less than half a cable within, or to the
are some rocky heads upon which there are only 14 fathoms
stream sets strongly towards this point, which, becom-
then with westerly winds the stream is at its great
marked by a black buoy, lying N. by W. $4\frac{1}{2}$ cables from
Fort Impérial.

La Truite rock, lying on the west point of the
of the eastern channel into Cherbourg road, is about
east to west, and 30 fathoms broad. The shoalest
of the rock, where there are only 21 fathoms of water, lies
from the lighthouse
at end of



vicinity of the Truite than at the north-west point of the flat, yet both buoys are likely to drift from their position, and more dependence should be placed on the above landmarks than upon the buoys.

BANC de L'Île PELÉE.—This sandbank extends to the westward from Pelée island into the most sheltered part of the Grande-Rade. There are from 20 to 25 feet at the lowest tides on its western extremity, which lies S. by W., a quarter of a mile from fort Central. It limits the roadstead on its north and north-eastern sides, but there is excellent shelter for vessels of moderate draught between it and the eastern arm of the breakwater.

ANCHORAGES in RADE de CHERBOURG.—The principal anchorages for ships of war and large vessels are, the Grande-Rade, and the Mouillage de l'Ouest or Western anchorage; and for smaller vessels, those called the Petite-Rade, and the anchorage between Pelée island bank and the eastern arm of the breakwater. St. Anne bay does not afford good anchorage, as the soundings in it are irregular, the holding ground bad, and vessels would be exposed to great danger if caught there with northerly winds, which throw in a heavy sea.

La Grande-Rade is bounded on its north and north-east sides by the Banc de l'île Pelée, on its east and south sides by the sandy bottom adjoining the shore, and its western limit is on the meridian of Cherbourg church. The bottom in the northern part of the road is for the most part composed of schistose rock in a state of decomposition, and the holding ground is good; immediately to the southward of this rock the bottom is of fine muddy sand, which is not sufficiently stiff to hold well, but it improves on nearing the shore, and holds well in the southern part of the road, particularly south of the line on which Nacqueville church-tower is in one with the spire of Querqueville church. A short distance, however, to the southward of this line there is not sufficient depth for large vessels to anchor at low water, and it would be too near the shore.

The pilots moor vessels S.E. and N.W., and veer cable to meet the alternate streams of flood and ebb; but as the streams are generally weak, it would, perhaps, be advisable to moor with open hawse to the N.W. to withstand the winds from that quarter, which are frequent. Fresh winds from N.W. to North throw a heavy sea into some parts of the road, but it is sheltered from strong N.N.E. winds; those from E.N.E. to E.S.E. raise a heavy swell only from the time of half flood to half ebb on the shore.

Mouillage de l'Ouest or western anchorage lies about 2 cables southward of the western arm of the breakwater, and has a bottom of fine sand and broken shells extending 8 cables east and west with depths of 7

The anchorage between Baze de l'Île Pelée and the eastern arm of the breakwater is used by merchant vessels when seeking shelter in Cherbourg road from severe weather from N.N.W. round northerly, to E.N.E. Its limit here from the meridian of Fort Central, where it is $2\frac{1}{2}$ cables broad to about $1\frac{1}{2}$ cables to the westward of the eastern extremity of the breakwater, where it is only $1\frac{1}{2}$ cables broad. The bottom at this anchorage is mud, mixed in some places with a little mud, and the depth, which decreases towards the bank, varies from 26 to 32 feet; vessels should not anchor here with strong winds from W.N.W., round southerly, to S.S.E., as the holding ground is not good with those winds.

Ships of war and vessels of large draught enter Cherbourg road by the channels lying at the two extremities of the breakwater. The principal channel, named *Passe de l'Ouest*, is that to the westward, between the west end of the breakwater and the Basse Chavagnac, and is about half a mile wide.

CHANNELS into RADE de CHERBOURG.—Ships of war and vessels of large draught enter Cherbourg road by the channels lying at the two extremities of the breakwater. The principal channel, named *Passe de l'Ouest*, is that to the westward, between the west end of the breakwater and the Basse Chavagnac, and is about half a mile wide.



Passe de l'Ouest.—There is no difficulty in entering this channel with a leading wind, but vessels of large draught turning in with the flood stream must be careful to avoid the Chavagnac, also the rocky head of 14 feet lying E. by N. $\frac{1}{3}$ N. half a mile from Rochefort rock, and the Tenarde shoal; it would be imprudent to turn through at night except during very fine moonlight. The leading mark through at night when the moon is near the horizon, and its light sufficiently strong to distinguish Honnet fort, is the *red* light on the eastern jetty of the port du Commerce kept a little open westward of the upper battery on that fort; but in a dark night in a sailing vessel it would not be safe to trust to it, especially on the flood.

The Channel between fort de Querqueville and the Basse Chavagnac is not so wide as the western channel, and it should only be used by large ships in cases of absolute necessity, and then only between half flood and half ebb. No sailing vessel should attempt it during calm weather, as there would be great risk of being drifted upon the rocks at the head of St. Anne bay by the eddy on the flood caused by Querqueville point; neither would there be any advantage in hugging the shore of this bay with land winds, as they frequently come in gusts from the openings of the valleys, particularly when it blows hard from the south-west.

Passe de l'Est or eastern channel into Cherbourg road lies between the eastern extremity of the breakwater and the black buoys which mark the two most dangerous spots on the western edge of Pelée island flat, viz., the north-west point of the flat and the Truite rock. The narrowest part of the channel is $2\frac{1}{2}$ cables wide between the breakwater and the Truite buoys, and has from 28 to 32 feet in it at low water, but besides being narrow, this channel has the disadvantage of being crossed obliquely by the tidal streams, rendering it dangerous for sailing vessels with light winds, and impracticable during calms; there is, however, no difficulty or danger in a steamer or with a commanding breeze.

Vessels coming from the eastward, and intending to run through this channel on the flood, should be careful to give a good berth to the north-west point of Pelée island flat, as that stream sets strongly towards it, and not to get into the exact line of the channel until the point is passed. It would be advisable for ships intending to take this channel to approach with Octeville church just open of fort Musoir Est, S.W. $\frac{1}{4}$ W., which would lead in clear of the north-west flat of Ile Pelée should the buoy be gone; and on closing the fort, alter course so as to pass between the buoy of La Truite and the red buoy at the east end of the breakwater. This channel is available for ships of the largest draught between half flood and half ebb.

The Channel to the southward of Pelée island trends in a W. by N. and E. by S. direction, $5\frac{1}{2}$ cables long and a cable broad, and carries a depth of

... tower, in line with the small church, and as long as it is covered vessels drawn in may enter this channel when in charge of a pilot.

DIRECTIONS.—Approaching Cherbourg Westward.—The western entrance to Cherbourg is 34 miles from the Start point, S. by E. 59 miles from the Lizard and S.S.W. 60 miles from the Needles. When bound westward, the best landfall to make is the coast of the Lizard and the Start, and having ascertained the proper course should be shaped for the Casquets, and not for the Needles, which would be the proper track if bound for Le Havre.*

These directions, however, apparently so simple, require great caution should be used in reference to the direction of the tidal streams, as well as to the state of the atmosphere. Under certain circumstances, may render the approach to the Casquets difficult but dangerous. On nearing these islets great care must be taken not to get too close to the southward of them, particularly while passing their shores, for should this precaution be neglected, there is great risk of being drawn into the channel which runs between Alderney and Jersey, and eventually to be obliged to cross Alderney, where the sea is most agitated there.

Having arrived at a position about 9 miles N.W. of the Casquets, the courses to steer will be as follows:—First, E. $\frac{1}{2}$ S. for 11 miles, then eastward of the meridian of the western point of the Casquets to bear S.W. by W. $\frac{1}{2}$ W., and then to the Hague S.E. $\frac{1}{4}$ S.; then E.S.E. 11 miles, which will bring the vessel to the point where the Nez-de-Jobourg and the Calenfrier are in line.

The most practical pilot at Cherbourg is M. de la Roche.



at the cape bears S.S.W. $\frac{1}{4}$ W.; and, lastly, S.S.E. $\frac{1}{2}$ E. $14\frac{1}{2}$ miles, which will lead to the entrance of the western channel into Cherbourg road.

The above are the best courses that can be steered by large vessels with winds between N.N.E., round northerly and W.S.W., for they will lead a safe distance outside the dangers, and also outside the strong streams of tide running through the Ortach and the Swinge channels and Alderney Race, which must be guarded against during springs, in order not to be drifted too far to the northward; for, if with south-west winds and during the flood, the meridian of cape de la Hague should be crossed at 6 or 7 miles from the shore, a sailing vessel may possibly miss the entrance to Cherbourg road. With the wind between W.S.W. and S.S.W. an E.S.E. course may be shaped from the above position, (N.W. 9 miles from the Casquets), which will lead about $2\frac{1}{4}$ miles from the shore on the meridian of the cape, and the road can be gained without difficulty. The above courses may also be followed during the ebb stream; but when the wind blows fresh a heavy sea will be found off the entrance of the before-mentioned channels.

At Night.—Approaching the western channel into Cherbourg road at night, when to the eastward of cape de la Hague, keep the light on that cape in sight over the land, until the *fixed* white light in Querqueville fort bears S.S.W., then stand to the southward until the light in fort Impérial is to the southward of fort Central light, when the seaman must be guided by the *red* light on the west end of the breakwater.

The most unfavourable winds for a sailing vessel to approach Cherbourg from the Casquets are those from the eastward, and especially a S.E. wind. With moderate winds, however, from these quarters, when the sea is generally smooth, and during the flood, the passage is not difficult; but on the ebb it is absolutely impossible, and she should then make a long board to the northward and endeavour to hold her own until the stream slackens; the shore should then again be approached, to take advantage of the first of the flood, and long boards made to endeavour to reach the road, or a position to the eastward of its meridian, so as to be able to enter with the latter part of the flood or the beginning of the ebb. Calms and fogs are mostly to be feared when making this passage, on account of the great strength of the streams, and under either of these circumstances every effort should be made to get into the middle of the Channel, where the streams are much weaker than near the French coast.

From the EASTWARD.—The course and distance from Beachy head to cape Barfleur is S.W. by W. $\frac{3}{4}$ W., 85 miles. Vessels coming from the North Sea or from the northern part of the English channel and bound for Cherbourg, with the wind between North and East, generally, after clear-



Race, vessels should endeavour to leave Cherbourg road at such a time as will enable them to be at the entrance of the Race towards half ebb on the shore, that is, at the entrance of the flood stream in that channel, and they should then steer so as to pass through the centre of it.

When bound to the eastward from Rade de Cherbourg with a westerly wind, weigh towards half flood, or if in the floating basin of the port du Commerce, quit it as soon as the gates are open, and run out of the eastern channel noticed in page 23. When well clear of this channel a vessel will have the beginning of the flood stream, and if favoured with a fresh breeze, she will carry that stream for 8 or 9 hours to the eastward.

Tides.—It is high water, full and change, in the port du Commerce, at 7h. 49m., and the water rises above the sill of the floating basin (which is 15 inches above the level of the lowest tides), extraordinary springs rise from 19 to 21 feet, ordinary springs 17 to 18½ feet, and neaps 13 feet. Strong winds from the westward cause the tides in the Avant port to rise one or 2 feet above that during calm weather, and easterly winds have contrary effect. With violent westerly winds at the springs, the sea frequently flows over the quays of the outer harbour. The mean duration of the flood is 5h. 45m. and of the ebb 6h. 35m.

The flood stream begins to be felt in the Grande-Rade half an hour after the time of low water on the shore, and ceases three-quarters of an hour after high water; its direction is S.E., and its rate about 2 knots. The greatest speed of the ebb stream, which runs to the N.W., hardly ever exceeds 1½ knots, unless the wind is strong from N.E. or East.

In the Mouillage de l'Ouest the flood stream commences about an hour after low water on the shore, and ends an hour after high water. The streams are feeble throughout the whole extent of this anchorage, and also in the eastern part of it.

The Petite-Rade lies in the eddy of the flood stream occasioned by the projection of Homet point. This eddy extends as far as the northern limit of the road, and forms a counter stream which sweeps along the shore to the W.N.W. from about 3 or 4 cables to the eastward of the entrance to the port du Commerce to the head of the bay, then north along the boundary wall of the dockyard. It begins about half flood on the shore and continues until high water; its greatest velocity is about 1½ knots at springs, decreasing towards high water. The ebb stream follows in the same direction, and at half ebb, when it is at its greatest strength, its rate is about 2 knots.

About half a mile to the northward of the western channel into Cherbourg road the flood stream, which runs towards the S.S.E. and S.E., commences about 1½ hours after low water on the shore, and ends 1h. 20m. after high water, its greatest speed being 3 knots. The ebb runs N.W. by N. at



LIGHTS.—There are two lights at port Becquet, 76 yards apart N. 40° E. and S. 40° W.; these lights, the inner *red*, elevated 28 feet above high water, and the outer *white*, elevated 24 feet, should be seen in clear weather respectively, 9 and 7 miles, and when in line lead into the port.

Les Grunes de Bretteville is the name given to the rocky bottom, three-quarters of a mile wide, extending off perpendicularly from the shore between Hue and Brique points, to where Nacquerville church-tower is seen in line with the Happetout rock, which forms the north-east point of Pelée island. The depths over this bottom are tolerably irregular, from 13 feet near the shore, to 10 fathoms about a mile off. The only dangerous spot is a head of rock, with only 12 feet water, lying $5\frac{1}{2}$ cables from the shore, with Le Castel, near Brique point, bearing S.E. by E. $\frac{1}{4}$ E., and Bretteville church tower S.W. $\frac{1}{4}$ W.

ANSE du CAP LEVI lies three-quarters of a mile to the south-west of that cape, and its shore is not accessible, even at high-water, except in a small cove, sheltered by a jetty of stone work, which is almost entirely destroyed by the sea. At 3 or 4 cables to the West and W.N.W. of the jetty there is good holding ground in 9 fathoms, over muddy bottom, where vessels bound to the eastward with adverse winds may wait in safety during the ebb. This anchorage is protected by fort Levi, which is built on the northern point of the bay.

CAPE LEVI is a low point, being the northern termination of some slightly elevated hills detached from the high lands of the interior. On the highest parts of these hills stand two houses, very close to each other, which may be seen afar off; the northernmost is an old semaphore and the other a guard-house. Several rocky patches which uncover extend as far as 4 cables to the north-east from the cape. The outermost patch is terminated by a remarkable rock, called the Bieroc, which has a rounded head rising 5 or 6 feet above high water.

LIGHT.—On the extremity of cape Levi stands a square lighthouse, from which at an elevation of 115 feet above high water, is exhibited a *fixed* white light, varied by a *red flash every three minutes*, and should be visible in clear weather from a distance of 11 miles.

RAZ du CAP LEVI is the name given to the strong eddies occasioned by the uneven rocky ground, which extends N. by E. $\frac{1}{4}$ E. 2 miles from the extremity of the cape. This rocky ground in some places is half a mile wide, and considerably elevated above the general level of the bottom, and, as it lies across the direction of the tidal streams, the eddies it makes cause a heavy sea, particularly during a weather tide. It is stated by the local pilots that this race at springs, with strong easterly

winds on the flood, is as dangerous and as much agitated as Alderney Race.

Some patches rising from this rocky bottom are dangerous, even for small vessels, at all times of tide; they are named the Bieroc, the Basse du cap Levi, the Pierre Noire, and the Tête Septentrionale or Northern Head of the race.

Lo Bieroc is a small rocky patch of only 3 feet at low water, lying $1\frac{1}{2}$ cables to the northward of the Bieroc rock, from which it derives its name.

Basse du Cap Levi is a rocky ledge about 2 cables long in a N.N.W. and S.S.E. direction, and $1\frac{1}{2}$ cables broad; on its south-east point there is a dangerous 13-foot patch, lying N.N.W. $\frac{3}{4}$ W. half a mile from the Bieroc rock.

La Pierro Noiro or Black rock, lying N. $\frac{3}{4}$ E. one mile from the summit of the Bieroc, is one of the most dangerous rocks in the race, having only 7 feet on it at the lowest tides. A black bell buoy is moored outside the northern extreme of this danger. This buoy occasionally breaks adrift.

Tôte Septentrionale lies at the north-west extremity of the rocky bottom, N. $\frac{1}{4}$ W. $1\frac{1}{10}$ miles from the Bieroc rock; E. $\frac{3}{4}$ N. $6\frac{1}{10}$ miles from fort Central, on Cherbourg breakwater; and N.W. by W. westerly $8\frac{1}{2}$ miles from cape Barfleur lighthouse. There are 33 feet on this rocky head at low water, but as it rises precipitously from soundings of from 19 to 25 fathoms, it causes great eddies, and the sea breaks upon it in bad weather.

Vessels of moderate draught, under charge of pilots, may, if the weather permit, cross the race in the channel between the Basse du cap Levi and the Pierre Noire at low water; but large vessels should always pass to the northward of the race.

The COAST between capo Levi and cape Barfleur, which are distant 8 miles from each other and lie on the same parallel of latitude, is generally low and sandy, but the adjacent lands rise at a short distance from the shore, and are joined by slight undulations to the hills in the interior, the highest of which are Carneville heath, the woody mound at St. Pierre, the hills bounding Saire valley, and La Pernelle hill.

ANSE de la MONDRÉE situate immediately to the eastward of cape Levi, between the Bieroc and Blanche rocks, is about $1\frac{1}{2}$ miles wide and three-quarters of a mile deep; good anchorage will be found on its western side, in $7\frac{1}{2}$ fathoms over muddy bottom, where vessels turning to windward against westerly winds may wait during the flood; but it



must not be used except in the finest weather, for should they be surprised in it by strong winds from N.W. to N.E. and it become necessary to weigh during the flood, they would be drifted amongst the numerous dangers lying off the coast to the eastward. The best anchorage is with the Bieroc bearing N.W. by N. distance $3\frac{1}{2}$ cables and the semaphore on cape Levi W.S.W.

ANSE de ROUBARIL.—No landing can be effected on the coast between cape Levi and cape Barfleur, not even in Mondrée bay, during fresh northerly winds, except in a small cove named Roubaril, which lies half a mile to the westward of the latter cape, and in which coasters, under the care of good pilots, may take refuge in time of need. The local fishermen state that, in case of necessity, a vessel could be saved by running into it at high water, if under 12 feet draught. The cove is about half a cable wide and a cable deep, and the rocks bordering its sides are always uncovered. The water flows into it at about half flood.

DANGERS off the COAST.—The coast between Mondrée bay and cape Barfleur is studded with dangers, some of which extend to a distance of $2\frac{1}{2}$ miles into the offing; between them and the shore are some winding channels, through which coasting vessels having good pilots, may pass even at low water.

Le Sen is a small isolated rock just awash at the lowest tides, lying 8 cables from the shore, in a N.E. by N. direction from Coqueville church.

Basses du Sen.—These shoals are numerous, and form separate patches, extending to the west, north, and east of the Sen rock. The shoal lying to the northward of the rock is 8 cables long and $3\frac{1}{2}$ cables broad, and has two dangerous rocky heads on it, on one of which there are only $4\frac{1}{2}$ feet water; on the other head, which from its position is called the Tête du Milieu, or Middle head, there are $5\frac{1}{2}$ feet.

To the north-west of this shoal lie four isolated rocky heads, with from 21 to 31 feet water over them; the outer of these heads, named Tête du Nord-Ouest, or North-west head, lies with Gatteville church tower in one with a rock, which is awash at the highest neaps, at Neville point bearing S.E. $\frac{2}{3}$ S., and Saint Pierre-Eglise tower S. by W. $\frac{1}{4}$ W. and in line with a house at Coqueville, which on that bearing appears to stand a little to the right of the church tower of that village.

A fifth rocky head, with 9 fathoms on it, lies N. by E. $\frac{1}{4}$ E. three-quarters of a mile from the Middle head, with the flashing light on Cherbourg breakwater bearing W. $\frac{1}{3}$ S. $9\frac{4}{10}$ miles, and the revolving light at cape Barfleur S.E. $\frac{1}{4}$ S., but it is only dangerous on account of the heavy sea occasioned by the eddies.

12 miles the eclipses are total between the bright faces, but within 12 miles there is a faint continuous light.*

When the sun shines on these towers, the southern of the two may be seen at the distance of 15 or 16 miles, and the old or northern tower at 11 or 12 miles. They are difficult to distinguish when at some distance to the North or N.E. of them on account of the high land at their back, this land, however, having a remarkable break in its formation, will assist to mark their position,—it is the valley of the little river Saire, called Coupée du Vaast, which lies S.W. by W. $\frac{1}{2}$ W. $5\frac{1}{2}$ miles from the lighthouse. La Pernelle hill is also a remarkable object, and attracts particular notice by the church on its summit; it rises about S.W. $\frac{3}{4}$ S. 5 miles from the lighthouse, and when seen from the S.S.E., the N.N.E., or the N.N.W., it has the appearance of a promontory sloping gradually towards the sea.

RAZ de BARFLEUR.—This race is occasioned by the violence with which the flood and ebb streams precipitate themselves over the rocks forming a submarine extension from cape Barfleur. These rocks are based on the flat joining the land and extending about a mile, from East to S.E. from the lighthouse, as far as the line on which the church towers of La Pernelle and Monfarville are seen in one. They form three separate reefs; the first, with from 7 to 25 feet water on it, extends E. by N. half a mile from the lighthouse; the second reef, separated from the first by a deep called the Brèche-du-Raz, has a rock with only 17 feet over it, lying E. $\frac{1}{4}$ S. about $6\frac{1}{2}$ cables from the lighthouse; the third reef, named the Riden de Quénanville lies to the southward of the others, and is separated from them by another deep about 4 cables wide.

This latter reef, 2 cables broad, extends half a mile in an E.S.E. and W.N.W. direction, and its shoalest spot of 7 feet lies with Réville church-spire in line with the western side of a cluster of houses at the château of Monfarville,† and the guard-house on the summit of the eastern point of Roubaril cove touching the southern part of the highest of the houses (light keepers), dwellings which stand about $1\frac{1}{4}$ cables south-west of the lighthouse.

Barfleur race is dangerous at the springs when the streams run through at the rate of 8 or 9 knots, and with a fresh wind the sea breaks violently upon its whole extent. The broken water in the race depends generally upon the velocity and the hour of the tide, it sometimes extends to a great distance in an East direction from the lighthouse. The sea is necessarily much more agitated during springs, especially with north-east gales; but at neaps, the streams are not so strong, and the race is quieter.

* The northern or old tower was the first built, and served as a lighthouse until the year 1836, when the southern tower was erected for that purpose.

† This château stands S. $\frac{1}{2}$ W. one mile from Barfleur church, and being of a brown colour it contrasts much with the trees surrounding it.



At slack water, and with a moderate breeze, the extension of the race is only a strong rippling, and the most agitated part of it is not more than 2 or 3 cables wide. The fishermen, under these circumstances, cross it, passing through the Brèche du Raz. The Barfleur pilots also take small vessels through it at this time ; and to do this they only carry the necessary sail to steer well, so as to avoid the broken water and to keep the vessel's head to the sea.

TABLE shewing the direction and rate of the Tidal Streams, during Ordinary Springs, between the Casquets and cape Barfleur.

Positions.	Tidal Stream.	Time with reference to High Water at Cherbourg.	Direction.	Rate.	Duration.
W. by N. $\frac{1}{2}$ N., 11 miles from Casquets.	Beginning of flood	h. m.		Knots.	m.
		4 0 before	S.E. . . .	0'3	—
		1 45 "	E. by S. . .	4'0	—
		At high water	E. by N. . .	4'0	—
	" ebb	2 10 after	N.W. . . .	0'3	—
		4 40 "	W. by N. . .	4'0	—
		6 15 "	S.W. by W. .	4'0	—
N. by W. $\frac{1}{2}$ W., 12 $\frac{1}{2}$ miles from Casquets.		4 40 before	From S.S.W. to S.E. by S.	1'0	—
	" flood	3 50 "	S.S.W. . . .	0'1	—
		2 50 "	E.S.E. . . .	1'1	—
	" ebb	At high water	East	2'4	2 0
		2 50 after	S.S.E. . . .	0'1	—
In the middle of Alderney Race.		5 50 before	W.S.W. . . .	2'7	2 0
	" flood	3 10 "	E. by S. . .	—	—
		0 20 "	E.N.E. & N.E.	7'5	2 0
	" ebb	2 50 after	N.W.	—	—
		3 40 after to } 4 40 before }	W.S.W. & W. } & S.S.W. }	7'0	2 30
N. $\frac{1}{2}$ W., 16 miles from cape de la Hague.	" flood	3 15 before	—	0'0	—
		At high water	E. by S. . .	3'9	2 0
	" ebb	2 45 after	—	0'0	—
		5 45 "	West	3'7	2 0
N.E. by E. $\frac{1}{2}$ E., 5 $\frac{1}{2}$ miles from cape de la Hague.	" flood	3 0 before	—	—	—
		0 10 "	East & E.S.E.	4'0	2 30
	" ebb	2 50 after	—	—	—
		6 0 "	W. by N. . .	3'5	2 0
N.N.W., one mile from Querqueville fort.	Maximum of ebb	4 50 "	N.W.	3'7	—
	" flood	2 45 before	S.E.	4'0	2 0
N.N.E., 2 miles from Cherbourg breakwater.	Beginning of flood	3 30 "	—	—	—
		0 45 "	E. by S. $\frac{1}{2}$ S.	3'0	—
		2 0 after	S. by W. . .	0'6	—
	" ebb	2 20 "	—	—	—
		5 30 "	W.N.W. . . .	2'5	—
N.E. by E. $\frac{1}{2}$ E., 29 $\frac{1}{2}$ miles from cape de la Hague.	" flood	2 45 before	S. by W. . .	0'2	—
		1 45 "	E.S.E. . . .	2'7	—
		At high water	E. by S. $\frac{1}{2}$ S.	5'0	1 30
	" ebb	1 45 after	—	2'5	—
		3 15 "	—	0'0	—
		4 35 "	W.N.W. . . .	2'2	—
		5 50 before	W. by N. $\frac{1}{2}$ N.	4'0	2 0
		4 15 "	—	2'2	—
N.N.E., 2 miles from cape Barfleur.	" flood	3 45 "	—	—	—
		1 0 "	S.E.	6'0	1 0
	" ebb	2 5 after	—	—	—
		5 0 "	From N.N.W. to W.N.W.	5'5	1 15
N.N.E., 7 miles from cape Barfleur.	" flood	3 0 before	—	—	—
		1 0 "	S.E. by E. $\frac{1}{2}$ E.	6'0	1 0
	" ebb	2 50 after	—	—	—
		5 30 "	N.W.	5'5	1 15
East, 21 miles from cape Barfleur.	" flood	2 30 before	N.W.	0'4	—
		0 30 after	S.E. $\frac{1}{2}$ E. . .	3'8	2 0
	" ebb	2 30 "	E.S.E. . . .	0'3	—
		6 0 before	N.W. $\frac{1}{2}$ W. . .	3'5	2 30



CHAPTER II.

BAIE DE LA SEINE.—CAPE BARFLEUR TO CAPE D'ANTIFER.

VARIATION IN 1882.

Cape Barfleur	-	-	-	18° 20' W.
Cape D'Antifer	-	-	-	18° 00' W.

BAIE de la SEINE is comprised between cape Barfleur and cape D'Antifer, which bear E. by S. $\frac{3}{4}$ S. and W. by N. $\frac{3}{4}$ N. of each other, distant 56 miles. Its circuit, without taking into account the shores of the mouth of the river Seine and of the Grand Vay, is about 96 miles, and it is about 24 miles deep towards the mouth of the river Orne.*

This bay is open to all winds between N.W., round northerly, and N.E., and a heavy sea is thrown into it when they blow with any strength. At the springs the streams, noticed at page 91, run at the rate of 3 or 4 knots, and all the harbours within its circuit become completely dry even before low water; during the neaps there is little water in any of them, and they are, consequently, not then accessible to vessels of large draught. From these causes a vessel would be in a dangerous position if embayed here during strong northerly winds. All the indentations of the shores of the bay, which lie out of the fair line of the tidal streams, are blocked up with sand, and the accumulations brought in to them by the rivers. The principal headlands and harbours are well lighted, and thus distinctly marked during the night; but, unfortunately, these useful guides, as well as the characteristics of the coast by day, are frequently obscured by the haze and fogs, which at times are very embarrassing.

PORT BARFLEUR is situated S. by W. $1\frac{1}{2}$ miles from cape Barfleur lighthouse, and its position is clearly pointed out by the church built upon the northern point of the entrance. The port, which is only 3 cables long and 2 cables broad and dries at low-water springs, is sheltered by the

* See Admiralty chart:—North Coast of France, sheet XI., Barfleur to cape d'Antifer, No. 2,613, scale, $m = 0\cdot5$ inch.

land from South, round westerly, to N.N.E., and is protected from the sea during strong easterly winds by the Antiquaires rocks, lying in front of the entrance.*

A small jetty of stonework extends 160 feet in a S.S.W. direction from the northern point of the entrance; there is also a breakwater 200 yards long, extending in a N.N.E. direction from the southern entrance point.

The bottom in the port is generally good for vessels taking the ground, being composed of mud mixed with broken shells, sand, and gravel, but there are some rocky patches upon which it would be dangerous to place them. The best and most commodious berths are near the entrance, where the bottom is soft and the tide rises higher than elsewhere, but vessels using them must moor securely to the large iron rings fixed in the rocks, as they will be exposed to easterly winds, and sea, at springs, when the Antiquaires are covered. Vessels loading or unloading lie alongside the north quay where the bottom is 4 feet above the lowest tides; the bottom over the rest of the port is from 4 to 10 feet above the same level. Alongside the north quay there are 16 to 17 feet at high-water ordinary springs, 18 to 20 feet at equinoctial springs, and 9 to 10 feet at neaps; thus vessels of less than 9 feet draught can enter the harbour at high water with any tide. The little traffic carried on is in flax, hemp, butter, oysters, and fish.

The outer danger in approaching port Barfleur is a rocky shoal, named Riden des Dents, upon which there is a dangerous patch with only 9 feet water, lying about a mile from the shore in an E.S.E. direction from Gatteville church-tower. The Anglais rocks lie about N.E. by E. 3 cables from the jetty, and the highest head, named Vinberge rock, uncovers 7 feet at low water. A red buoy is moored near the southern edge of Vinberge rock. The Hintar rock, lying E. $\frac{1}{2}$ S. nearly a quarter of a mile from Vinberge rock, uncovers 5 $\frac{1}{2}$ feet, and a large iron ring is fixed on it for the convenience of vessels that may warp into the harbour or anchor near it in the road. A black buoy is moored near the western edge of Hintar rock.

A Life Boat is stationed at port Barfleur.

LIGHTS.—Two *fixed* white lights, dioptric and of the fourth order, are exhibited, one, 23 feet above high water on the southern side of the entrance to port Barfleur, at 230 yards W.S.W. from the rocky point abreast the north jetty, and the other 43 feet above high water, S.W. by W. $\frac{1}{4}$ W., 309 yards from the former; both may be seen in clear weather from a distance of 9 miles, and when in line they lead to the entrance.

* See Admiralty plan :—Port Barfleur on Sheet XI., No. 2613.



Directions.—Vessels rounding cape Barfleur from the westward and bound to port Barfleur should, after passing the swell at the outer end of Barfleur race, take care not to go to the westward of La Pernelle and Monfarville church-towers in line, bearing S.W., unless they are of light draught, or the tide has risen considerably. The two harbour lights in line bearing S.W. by W. $\frac{1}{4}$ W., will lead through the channel to the port, between the western rocks of the Antiquaires reef and the dangers bordering the shore between cape Barfleur and the northern point of the port.

The channel narrows considerably between the Hintar and the Anglais rocks, and thence to the entrance of the port it is only 60 fathoms wide. The eastern side of the channel is marked by two beacons. The entrance to the port is only 300 feet wide between the extremities of the jetty and the breakwater.

Anchorage.—Vessels arriving before high water with off shore winds may anchor in Barfleur road, which is a small deep formed between the Plateau des Antiquaires and the Gaillarde and Anglais rocks. The best anchorage is in about 5 fathoms over good holding ground, with La Pernelle and Monfarville church-towers in line bearing S.W., and Crabet windmill just open to the northward of the small hillock on La Masse point, W.N.W. This anchorage should only be used during land winds and fine weather; should vessels, however, be surprised in it by northerly or easterly winds they must moor with open hawse to the northward, the heaviest anchor being to the eastward. The scope of cable should be short, in consequence of the small extent of the anchorage, and during springs it will be necessary to shorten in as the water falls to prevent tailing on the rocks.

Tides.—It is high water, full and change, in port Barfleur at 8h. 59m.; at the foot of the north quay equinoctial springs rise 18 to 20 feet; ordinary springs 17 feet; and ordinary neaps $13\frac{1}{2}$ feet. The tides are very irregular, for with prevailing south-westerly winds the water rises higher, and with wind in the opposite direction it remains lower than the general level; and this peculiarity takes place in all the harbours along the coast of the bay of the Seine. The mean duration of the flood is 5h. 50m., and of the ebb 6h. 35m., but the duration of the flood between a neap and the following spring tide exceeds 6 hours, and sometimes reaches $6\frac{1}{2}$ hours, whilst between a spring and the following neap it is below the mean.

The flood stream follows the direction of the shore from cape Barfleur, and crosses the road and the channel. Its rate when greatest does not exceed 3 knots, and decreases suddenly at about half flood, when an eddy sets in an opposite direction, but with rather less speed. This

eddy is weak about high water, but its rate increases as soon as the ebb commences.

Pointe du Moulard bears S. by E. $\frac{1}{4}$ E. $1\frac{1}{2}$ miles from Barfleur church, and is but little elevated. Rocks which uncover at low water lie off the point, and rocky ground with shoal patches on it extends about a mile from the shore. The outer or eastern patch, named *Basse Orientale du Moulard*, with 26 feet lies E. $\frac{1}{2}$ N. 9 cables from the Moulard rock; when upon it Crabet windmill is in line with the northern extremity of l'Ilet at Barfleur. Vessels should keep a mile from the coast between Barfleur and this point whilst the Moulard rock is uncovered.

Le Moulard is a granite rock, lying S.E. by E. $\frac{1}{4}$ E., $1\frac{1}{2}$ cables from pointe du Moulard; this rock uncovers 23 feet at the lowest tides, and is a useful and necessary mark to all who navigate along this part of the coast; for when it is covered and the sea smooth, there is water for large vessels over all the hidden dangers between cape Barfleur and La Hougue.*

Pointe de Saire is the first prominent projection to the southward of cape Barfleur, the intervening coast being low, and appearing, when seen from any distance, to be covered with wood, above which church steeples are occasionally visible. La Pernelle hill rises N.W. by W. 3 miles from the point, and having a church on its summit forms the most remarkable object upon this part of the coast.

Réville battery is situated at the extremity of Saire point, and one of the lights for affording facility for entering La Hougue road at night is shown from its south-western face.†

Ridens des Ecraoulettes are banks composed of sand, lying about a mile from the shore a little to the northward of the line on which the church towers of La Pernelle and Réville are in line with not less than 28 feet upon their shoalest parts; Gatteville church-tower and the Moulard rock in line, N.N.W. $\frac{1}{4}$ W., or La Hougue fort tower in line with the highest house of the lazaretto on Tatihou island, lead to the eastward.

Roches Dranguet.—About half a mile to the southward of the Ecraoulettes are some rocky patches, named the Dranguet rocks, which extend a mile from the shore. They are dangerous even for small vessels, and there is a high sea upon them during a weather tide. Barfleur church-tower in line with the Moulard rock leads to the eastward of the outer shoal, which has 25 feet water on it.

Le Pont de Saire, or Saire bridge, is a sort of rocky causeway extending a mile to the south-east from Saire point as far as where La

* The granite rock along this shore and near Barfleur is worked in large quantities for building purposes.

† See Admiralty chart, Rade de la Hougue, No. 2,743; scale, $m = 2$ inches.



Hougue fort tower is seen touching the north-west angle of the fort de l'Ilet, W. $\frac{1}{2}$ S., which lies close to the southward of Tatihou island. With the wind upon the shore the sea runs very high upon this bridge as long as the tide makes to the north-east, or from the time of half flood to low water.

Basses de Réville and de la Pernelle.—Several rocky patches lie outside Saire point, but they are only dangerous in bad weather. Those farthest out are named the Réville with 27 feet, and the Pernelle with 36 feet water on them at the lowest tides. They both lie with Barfleur lighthouse in line with the summit of the Moulard rock bearing N. $\frac{1}{2}$ W., the former about $1\frac{1}{4}$ miles, and the Pernelle $1\frac{3}{4}$ miles from Saire point; the western mark for the Pernelle is, Morsaline lighthouse just showing to the southward of the fort de l'Ilet, W. $\frac{1}{2}$ N.

From Saire point the direction of the coast changes, and trends to the south-west. St. Vaast point, on which stands the church of the small town whence the point takes its name, bears S.W. by W. $\frac{3}{4}$ W. $1\frac{1}{4}$ miles from Saire point, and the intermediate coast forms a deep bight, at the bottom of which the waters of the little river Saire, after winding round the north side of La Pernelle hill, lose themselves upon a low sandy beach. The fortified island of Tatihou, the small fort de l'Ilet, built on the rocks close to the southward of that island, and the rocks which surround them, partly close up the entrance to this bight, and at low water they join the main land by a beach of gravel, sand, and rock.

ST. VAAST.—This small tidal harbour is formed on the east side of the town of St. Vaast, to the northward of a jetty of masonry, and is sheltered by the land and the jetty, from South to North, round by the west, and by Tatihou island from the high sea and the strong winds from the eastward. There is a fine hospital and building yards, and a trade in deals, masts, dried fruits, copper, &c.

The bottom in this harbour is composed of a mixture of sand, gravel, and a little mud, and small vessels are supported on it by their legs, and vessels of greater burthen by heaps of faggots tied together and placed in their run on each side of the keel. The bottom on the western side of the harbour dries 6 feet, and on the eastern side 4 feet, above the level of the lowest tides, and above the latter ordinary springs rise 13 to 14 feet, equinoctial springs 18 to 19 feet, neaps 9 to 10 feet; hence it will be seen that this harbour is only generally accessible to vessels under 9 feet draught.

The southern passage to the harbour is between the rocky ridge extending from the jetty to the south point of La Hougue fort, and Tatihou island and the rocky ledge which extends half a mile to the south-eastward of the fort de l'Ilet, and terminates in two rocky groups, named the Dent and the Gavendest; the highest head of the former uncovers 7 feet, and

the Gavendest 6 feet at low water. The Plateau du Ouest-Drix spreads out to the southward of these rocky groups, and a shoal spot of 15 feet lies on it, at 3 cables to the southward of the Dent.

A. Life Boat is stationed at St. Vaast.

LIGHTS.—Three *fixed* white lights, of the fourth order, have been established to give facility at night for entering St. Vaast and La Hougue harbours, and La Hougue road. The northernmost light is placed on the south-west face of Réville battery, at the extremity of Saire point, at 36 feet above high water, and when in one with cape Barfleur light, N. $\frac{1}{2}$ E., marks the eastern extent of the dangers near Tatihou island; the second light is placed on the south extremity of La Hougue fort, at 36 feet above high water; and the third upon the heights at Morsaline at 282 feet above high water, a mast 26 feet high surmounted by a ball is placed behind the lantern of this light. All three lights may be seen in clear weather at the distance of 9 miles. A small *fixed red* light, visible 5 miles, is shewn from the end of St. Vaast jetty. A small *fixed green* light is also shewn from the extreme north end of the dike at Saint Vaast harbour, and is visible 2 miles.

Fog signal.—A bell is sounded in foggy weather from the extreme of Saint Vaast jetty.

Directions.—When bound into St. Vaast harbour the lighthouse upon the heights at Morsaline kept about a quarter of a point open to the southward of La Hougue lighthouse, W.N.W., will lead to the southward of the shoal patch of 15 feet on the Ouest-Drix flat, and when the spire of Réville church appears to the westward of the fort de l'Îlet, steer for the end of the jetty. Morsaline lighthouse kept exactly in the centre of the interval between La Hougue lighthouse and the large tower in the middle of La Hougue fort will lead between the Ouest-Drix patch and the Gavendest; but this passage should not be attempted when the sea is heavy, neither should it be used by a stranger at night.

It is difficult to leave St. Vaast harbour with the wind between S.W. and S.E., as both flood and ebb run to the northward; but small vessels at that time, guided by pilots, can leave the harbour at the moment of high water springs, passing to the northward of Tatihou island, and keeping about a cable from its northern shore.

Tides.—During the whole of the flood the stream runs to the northward between the end of the jetty of St. Vaast harbour and Tatihou island, and the ebb follows the same direction until the highest part of the beach joining that island to the land is uncovered, which is the case at about half ebb. When both streams are at their greatest strength a strong eddy forms at the end of the jetty, and extends over the whole of the harbour, and with a fresh wind from North to N.E. the sea within is much confused;



under these circumstances vessels which are placed too far from the jetty strike heavily before they float, and also before they ground on the ebb.

PORT de la HOUGUE is the name given to a good grounding place, 4 cables long and one cable wide, lying to the westward of and under the ramparts of La Hougue fort, which completely shelters it from winds and high sea from the eastward; the water, however, is generally smooth in it, except during northerly gales, or when it blows fresh from S.S.W. to S.E. The port will admit vessels of about 14 feet draught at high water springs and 9 feet at neaps, and it is the only place on the western side of the bay of the Seine, which, at the springs, can afford shelter in bad weather to vessels of moderate draught.

The best grounding places in this port are comprised between the parallel of the large tower which stands in the middle of the fort, and the wooden storehouse at the foot of the glacis, north of the fort; and they are bounded to the westward by a shallow channel which receives all the water flowing from the land. The bottom abreast the tower dries $7\frac{1}{2}$ feet, and abreast the wooden storehouse $9\frac{3}{4}$ feet above the level of the lowest tides; it gradually rises towards the northern part of the harbour.

Vessels should moor with 4 hawsers, their heads to the westward and sterns to the fort, and as close as possible to the rocks lying at the foot of the ramparts. The bottom is hard, being a mixture of muddy sand and gravel, and yields but little under vessels when aground upon it. Sharp vessels will be much strained unless care be taken to use their legs, or bundles of faggots fastened in their run on each side of the keel.

DANGERS.—The following dangers must be avoided when approaching Port de la Hougue, especially if there be a high sea on :—

Le Manquet, a small isolated rock which uncovers 6 feet, lying E.S.E. a short half mile from La Hougue lighthouse, and from its advanced position is much in the way of vessels navigating between La Hougue and St. Vaast. A black buoy is moored near the eastern edge of this rock.

Roche Joly, the top of which uncovers 3 feet, lies W.S.W. $6\frac{1}{4}$ cables from La Hougue lighthouse, and the sea breaks on it in bad weather.

Jean de la Dune is a small group composed of four rocky heads, which only uncover at the springs; the highest head is awash at the lowest tides, and lies S.W. by S. 7 cables from La Hougue lighthouse. The summits of the Jean de la Dune, the Joly, and another rock lying to the southward of it, are the highest heads of a rocky bottom, named the Verdieres reef, which extends in a north and south line along the

shore, and upon which there is a high sea when the wind blows upon the coast.

RADE de la HOUGUE.—This road lies to the south-eastward of port de la Hougue, and although the sand-banks in its vicinity are well known to be changeable, yet it affords good anchorage for vessels of large draught. It extends to the westward as far as the line on which the spires of Réville and St. Vaast churches are seen in one, N.N.E. $\frac{1}{4}$ E., and to the eastward as far as the Ouest-Drix flat and the northern part of the Banc de la Rade; its northern limit is on the parallel of the Dent and the Gavendest rocks, both of which have red buoys on them, and its southern boundary the small sand-bank named Haut-fond de la Grande Rade.

The holding is good in almost every part of this road, and vessels are well sheltered in it by the land from winds between S.S.W. and N.W., which are frequent and dangerous in winter; but the anchorage is open to winds from N.N.E. to S.S.E., which when moderate only send in a troublesome swell, but when blowing with any strength they raise a heavy sea. Vessels suspected of having contagious diseases on board are sent from all the northern parts of France to ride out their quarantine in this road, and at times there are several at anchor in it. The lazaretto is on the western side of Tatihou island.

In the southern part of La Hougue road there is a small deep, named the Grande Rade, about 6 cables long, in a N.E. and S.W. direction, and 2 cables broad, where large vessels may anchor on excellent holding ground. The best position is in the centre of the deep in 7 to 8 fathoms, with the church towers of La Pernelle and St. Vaast in one, N. by W. $\frac{1}{4}$ W., and the Bois de la Ville midway between Quineville church tower and a guard house on the shore.

La Petite Rade is the space included between the Grande Rade and the rocks off La Hougue fort, but the good holding ground in it does not extend much to the eastward of the line on which Réville light is seen touching the south-east angle of the fort de l'Ilet. Between this limit and the Grande Rade the holding ground is indifferent, being composed of sand and broken shells, and fresh easterly winds throw in a heavy sea.

The pilots anchor vessels in about 4 fathoms over good holding ground in that space, which has the following limits :—Quetehou church tower in line with the south point of La Hougue point; Morsaline and La Hougue lighthouses in one, and Réville lighthouse seen a little to the eastward of the fort de l'Ilet. From this anchorage vessels of moderate draught may run for refuge into port de la Hougue should they suffer much from the high sea caused by easterly winds. If drawing too much water to enter the port during the neaps, they can anchor in the northern part of La Hougue road



as the holding ground there is good, and should the wind blow hard from the N.E. they will in some degree be sheltered from the sea by Tatihou island and the rocks to the southward.

Directions.—The entrance to La Hougue road is between the shoal spot of 15 feet water on the Ouest-Drix flat, and the northern part of the Banc de la Rade (named the Bee shoal) which lie N. $\frac{1}{2}$ W. and S. $\frac{1}{2}$ E. from each other, distant 9 cables. There are from 11 to 15 feet upon the shoal spots of the Banc de la Rade, and the northern point of that bank, upon which there are 19 feet, lies one cable eastward of the line on which Réville church spire is seen a little open to the eastward of the tower on Tatihou island, and La Hougue lighthouse bearing N.W. $\frac{1}{2}$ W. From this point a bank, named Haut-Fond du Banc de la Rade, with 5 to 6 fathoms on it, extends in a north-east direction as far as where cape Barfleur and Réville lighthouses are in one, and La Hougue lighthouse bears N.W. by W. $\frac{3}{4}$ W.

Approaching La Hougue road from the northward the mariner should take care that his vessel is not drifted to the southward of it by the flood stream, which, from the extremity of the race off cape Barfleur to about 3 miles off Saire point runs to the southward, following the direction of the coast, at the rate of 3 knots during springs; close to Saire point it changes its direction suddenly to the south-west. Vessels of large draught should keep outside the several shoal patches lying off the coast, which they may do by attending to the marks already given in page 39 for leading to the eastward of them. When to the southward of the shoal water off Saire point, cape Barfleur lighthouse must not be brought to the westward of Réville lighthouse in order to avoid the dangers to the eastward of Tatihou island, and having arrived at the position where the line of cape Barfleur and Réville lighthouses in one, is crossed by the line of Morsaline and La Hougue lighthouses in one, steer W.S.W. for the Grande Rade. In running this course, should it be towards low water, cape Barfleur light will be hid a few moments by the tower on Tatihou, but anchor directly it reappears, bearing N. by E. $\frac{1}{4}$ E.

If bound for the anchorage in the northern part of La Hougue road, run in with Morsaline lighthouse just open to the southward of La Hougue lighthouse, which will lead about a cable to the southward of the shoal patch on the Ouest-Drix, and anchor as soon as Réville light is hidden by the fort de l'Îlet, or by the tower on Tatihou should the light be above the fort, which may be the case towards high water.

Tides.—It is high water, full and change, in port de la Hougue, at 8h. 42m., springs rise $18\frac{1}{2}$ feet; neaps $14\frac{1}{2}$ feet, and the tide rises abreast the large tower in the middle of the fort, 14 to 15 feet at ordinary springs,

and 16 to 17 feet at equinoctial springs. The rise is from $7\frac{1}{2}$ to $8\frac{1}{2}$ feet at the lowest neaps, but in the southern part of the harbour it is 2 or 3 feet higher, and vessels of about 9 feet draught may be placed there at that time. With fresh winds from S.W. to West, the tide rises a foot or two higher than in calm weather, and strong winds from N.E. to North produce a contrary effect.

The stream of flood, at springs, in the middle of La Hougue road, begins about $4\frac{1}{2}$ hours before the time of high water in the port, and runs towards the W.S.W. Its greatest rate is $2\frac{1}{2}$ knots, which is at about $2\frac{3}{4}$ hours before high water in the harbour, and its mean duration is 5h. 20m. The ebb stream commences about 25 minutes after high water in the port, and its mean duration is 7h. 10m. Its direction is towards the N.E. and E.N.E., and its greatest rate, $2\frac{1}{4}$ knots, occurs about 4h. 20m. after high water.

ILES ST. MARCOUF.—These two islands, the rocks around them which uncover at low water, and the Bastin rock, lie nearly midway between port de la Hougue and the entrance to the Grand Vay, at about $3\frac{1}{2}$ miles from the coast, and occupy a space of about four-fifths of a mile long, in an E.N.E. and W.S.W. direction, and a quarter of a mile broad. The islands are but little elevated above the level of high water, but during the day the fort and especially the large bomb-proof tower upon the highest point of the eastern island may be seen from a distance of 9 to 12 miles.

These islands are separated by a narrow channel, in which it would be dangerous to anchor in bad weather, as the tidal streams run through it with great rapidity; but coasting vessels having missed la Hougue road, with a strong N.W. wind and a flood tide, may anchor during the remainder of the flood in a small bight, named Mannette, on the southern shore of the western island, provided they are moored securely and steadied by a hawser to the shore, for the eddies formed by the points of that island occasion a heavy sea.

LIGHT.—A *fixed* white light of the fourth order, is exhibited from the tower upon the eastern St. Marcouf island, at 56 feet above high-water, and in clear weather is visible from a distance of 8 miles.

BANC de ST. MARCOUF extends 3 miles in a N.N.W. direction from the eastern St. Marcouf island, and the soundings vary from 26 to 34 feet between it and the southern part of the Banc de la Rade, which lies three-quarters of a mile nearer the land. These two banks appear to be formed of large masses of sand and broken shells having 7 to 12 feet upon the shoalest parts of the St. Marcouf, and 11 to 15 upon the shoal spots of the Banc de la Rade. The tides cross them obliquely and



occasion strong eddies even in calm weather, and with easterly winds or northerly gales the sea breaks violently upon both banks from half-ebb to half-flood. St. Marcouf bank is bounded at its northern extremity by a narrow ridge of sand, running about $1\frac{3}{4}$ miles in an easterly direction nearly at right angles with the Banc de la Rade, and as it lies nearly across the tidal streams, the eddies produced by it, at springs, cause a high sea when it blows hard.

BANC du CARDONNET extends in a S.E. $\frac{1}{2}$ S. direction $6\frac{1}{2}$ miles from the western St. Marcouf island to about N. $\frac{3}{4}$ E. $3\frac{1}{4}$ miles from the eastern mill at Criqueville, and forms, at about 4 miles from the coast, a barrier in front of the Grand Vay; from its south-eastern extreme, in 6 fathoms, Colleville church-tower is in one with Percée point bearing S.S.E. $\frac{1}{2}$ E., and the western windmill at Criqueville is in line with the buildings at Branche farm S.S.W. $\frac{1}{4}$ W. The bank is composed of sand and broken shells, and slopes gradually towards the south, but its northern side is steep-to, which causes the sea to break with great violence upon it when the wind is fresh from N.W. to N.E., or when there is much swell on, and especially during the ebb tide. The shoalest spots on the bank, from 4 to 10 feet, extend from West to S.S.E. about a mile from the island, and the sea breaks upon them with great fury with easterly gales on the ebb. Farther to the eastward, and towards the meridian of Maisy church, the depths vary from 14 to 17 feet on the bank, and gradually deepen towards its south-eastern extremity.

CHANNEL between ILES ST. MARCOUF and the COAST.—This channel, which begins to the south-east on the meridian of the Criqueville windmills and terminates to the north-west at La Hougue road, is deep, having 11 fathoms at its south-eastern entrance, gradually shoaling to the north-west. It affords good anchorage, except to the W.S.W. of the St. Marcouf islands, where a rocky bottom about three-quarters of a mile wide almost crosses the channel from the shore, and also to the E.S.E. and S.E. of Quineville, where the rocky shoals of St. Floxel extend $1\frac{3}{4}$ miles from the land.

The dangers to be avoided at low water are, the north-west part of the Cardonnet, which forms a small bank with 10 to 14 feet water on it lying in a S.S.E. and N.N.W. direction, at three-quarters of a mile to the westward of the western St. Marcouf island; the rocky shoals of St. Floxel, which lie to the south-east of Quineville church, and extend from the land as far as where La Pernelle church is seen 2° to the eastward of La Hougue tower; and the Bavequien rocks, which uncover at low water and border the beach from the parallel of St. Marcouf church, as far as a line E.N.E. from Quineville church.

The local authorities say that a vessel well found might ride out a heavy gale from the north-eastward in this channel, when under shelter of the high parts of the Cardonnet, the St. Marcouf, and the Rade banks, which break the violence of the sea; but this is but a precarious shelter, and should only be resorted to as a last resource, when a vessel is embayed and all means of getting out have failed of success, for the sea at that time is said to be very heavy in the channel between the banks during the flood, and a breaking sea is caused by the weather tide on the ebb. If a vessel is obliged to bring up in this channel, such an anchorage should be sought for, that in case she is unable to withstand the high sea and must run ashore, it may be on that part of the coast, which offers a chance of safety for the crew. The Magdeleine bank at the entrance of the Grand Vay should, however, be carefully avoided, as it is composed of hard sand, and a vessel running upon it would go to pieces in a few hours.

Directions.—The channel between the St. Marcouf and Cardonnet banks and the coast may be taken, even at low water, provided the weather be moderate, and strict attention paid to the lead. With a fair wind Percée point and Huppian wood in line N.W. $\frac{1}{4}$ N. will lead in the deepest water between the meridian of Maisy church and the western St. Marcouf island. From thence steer to the north-west until La Pernelle church tower appears 3 or 4 degrees open to the eastward of La Hougue tower; keep this mark on until Quineville church bears W.S.W., then haul to the northward for Rade de la Hougue.

Tides.—In the channel between the St. Marcouf islands and the shore, the rate of the streams at springs is about 3 knots, and their maximum speed takes place at about the time of half flood and half ebb in port de la Hougue. The direction of the flood in La Hougue road is W.S.W.; at the north end of St. Marcouf bank S.W. by W.; around the islands S.S.W. upon the middle of the Cardonnet bank South; and at about a mile to the eastward of the extremity of that bank S.E. In the middle of the channel, however, the flood runs nearly parallel with the shore from the road as far as the meridian of the St. Marcouf islands, it then turns to the S.S.W. towards the entrance of the Grand Vay, beyond which it again follows its original course parallel to the shore. The ebb is rather less rapid than the flood, and runs nearly in an opposite direction. At neaps both streams are feeble, except at the entrance of the Grand Vay.

GRAND VAY.—The shore is flat and composed for the most part of sand hills from port de la Hougue to the entrance of the Grand Vay, which is an indentation of the coast, formed in the south-west angle of the bay of the Seine, about 4 miles wide, and 6 miles deep, at the bottom of which are the small tidal harbours of Carentan and Isigny. The entrance



to this deep bight, lying 5 miles to the southward of the St. Marcouf islands, is almost entirely filled up with sand, and would probably cease to be navigable were it not for the annual freshets from the small rivers, the Taute and the Douve on its western shore, and the Vire and the Aure on its eastern shore, which form channels with just sufficient depth to admit vessels of moderate draught going up at high tides to Isigny, and even to Carentan. Formerly the tide flowed far into the interior, and the salt water spread itself over the meadows bordering the rivers; but to remedy this, dykes have been thrown up at the mouth of each river, with flood gates, which close with the rising tide. In 1857 there were 24 feet at high water in the Vire and the Aure at the equinoxes, and 13 feet at ordinary springs.

Banc de la Magdeleine.—The entrance to the Grand Vey is more than half closed up by the Magdeleine bank, which uncovers at low water upwards of $2\frac{1}{2}$ miles from the western shore, and which is the continuation of the sandy beach, half a mile wide, bordering the coast from port de la Hougue. The highest parts of this bank are scarcely covered at high-water neaps, and it is considered the most dangerous of the Grand Vay banks, for the streams cross it with great rapidity, and raise a heavy sea on a weather tide. The sand also which composes it is so hard that a vessel grounding upon it in bad weather would go to pieces in a few hours. A buoy with staff and ball is moored off its northern edge, and lies N.E. by N. three quarters of a mile from the red buoy at the entrance of the channel leading to Carentan.

Banc de la Ravine forms a projection of Coquebourg point, and divides the lower courses of the rivers Taute and the Vire. It extends to the northward as far as the parallel of Maisy point, its summit is barely covered at spring tides, and the greater part of its surface remains dry during the neaps. The whole space between Maisy point and this bank is occupied by shifting sands; that named the Feraillon is the only one that does not change its surface, being covered with gravel, below which there is said to be solid rock.

There is little danger in grounding upon the sands within the Grand Vay with smooth water during the dry season in summer, for the tides then have but little strength; but during abundant rains or equinoctial tides the ebb stream is very strong, and heaps up the sand under the vessels which lie aground, causing them to list over and upset.

MAISY POINT, the eastern point of the Grand Vay, is very low, but is defended against the heavy sea, which sometimes rolls in upon the coast, by a ledge, named Roches de Grand Camp, extending $1\frac{1}{2}$ miles to the westward and $2\frac{3}{4}$ miles to the eastward of the point. This ledge is



marked by four black buoys lying from a quarter to half a mile outside its outer edge. The fine church spire at Maisy, and the village and church at Grand Camp, serve to point out the entrance of the Grand Vay.

LIGHT.—From a mast situated 875 yards to the westward of Grand Camp church, a *fixed* white light is exhibited at an elevation of 26 feet above high water, visible in clear weather from a distance of 6 miles.

Anchorage.—There is good anchorage off the entrance of the Grand Vay, in Capelle road, where, during southerly winds, vessels may remain until the tide has risen sufficiently to allow them to enter the narrows. This anchoring ground, about a mile in extent, is bounded towards the west by a line on which Carentan church tower is in one with the eastern houses of Grand Vay hamlet; towards the east by the rocky bottom which terminates in the direction of the small fort in line with Maisy church spire bearing S. by W.; and towards the north by the high land of Ménéil, which rises to the eastward of port-en-Bessin, in line with Percée point; the latter mark will also lead outside the rocky ledge and dangers off Grand Camp.

The best position for anchoring is, with the end of Ménéil cliffs in line with Percée point, or a little open to the northward of it, and the small fort about a quarter of a point open to the eastward of Maisy spire. The flood runs at this anchorage S.S.W. and S.W. by S., and the stream changes about half an hour before high water. The most favourable time for entering the narrows is about $1\frac{1}{2}$ hours before high water, but with a head wind it will be prudent to weigh so as to arrive at Grouin point on the eastern shore of the Grand Vay, before the commencement of the ebb.

ISIGNY, situated 6 miles from the entrance of the Grand Vay up the river Aure, which falls into the river Vire, has a small tidal harbour, a stone quay 256 feet in length, and two small unloading slips. The staple of the town is salt butter, of which 100,000 pots, yielding 60,000*l.*, are exported annually; besides the butter, the exports are grain, colza oil, and stone, its population being about 2,500.

This harbour fills with mud during the summer when there is but little water in the Aure, but the freshets, which are occasioned by heavy rains, clear it out periodically, driving the mud into the channels. The water rises $9\frac{1}{2}$ feet at springs at the foot of the quay, and there are 2 or 3 feet more when the harbour is washed out. Vessels are lightened during the neaps on the shore at Grouin or Beuzeville before they can proceed up to the harbour.

The Passe d'Isigny, lying between the western end of the Roches de Grand Camp and the Banc Feraillon, is the name of the channel leading



up to Isigny. The channel is well marked by buoys and beacons as far as Grouin point, from whence it is embanked up to Isigny; it lies in a N. by E. and S. by W. direction from the point to the junction of the rivers Aure and Vire, but notwithstanding all these aids, it is necessary for a stranger to have a pilot.

LIGHTS.—There are at Isigny two *fixed* white harbour lights, bearing N. by E. and S. by W. from each other, 654 yards apart. These leading lights, which are dioptric and of the fourth order, are elevated respectively 23 and 46 feet above high water and may be seen in clear weather from a distance of 12 miles.

CARENTAN, situated up the river Taute at about 9 miles from the entrance of the Grand Vay, at the position where the Vire and Taute canal terminates, has also a small tidal harbour. The Carentan channel receives the waters of this canal as well as of the rivers Taute and Douve, and its depth is maintained by these united streams, but, as the rise of water is so small, very few vessels arrive up to the harbour, but take in and discharge their cargoes upon the dykes at Brérand. There is a castle and fortifications, and the town contains a handsome church surmounted by a spire. The manufactures are lace and cotton goods, and the trade is in cattle, horses, hemp, flax, cider, butter, and honey.

The frequent changes which take place in the channel leading to Carentan render it dangerous to attempt without a pilot, for to ground upon any of the banks at the entrance of the Grand Vay with a strong north-easterly wind, or upon the borders of the channel within the entrance during the rainy season, when the ebb tide is rapid, would cause the loss of the vessel.

This channel is long and winding and only practicable during springs for vessels of 7 or 8 feet draught; it is buoyed as far as abreast of the village of Grand Vay, from whence it is embanked up to the town of Carentan. There is a good grounding place on an excellent bottom of mud 3 cables to the southward of the Grand Vay hamlet.

LIGHTS.—Two *fixed* lights are now exhibited as a guide through the channel of Carentan; viz., a *red* light on the sea bank 16 feet, and a white light at Brérand 49 feet above high water; the upper light is distant 940 yards S.W. $\frac{1}{4}$ W. from the lower, and both are visible in clear weather 7 miles.

Tides.—The flood stream at springs loses its strength when the Grand Vay banks are covered. It crosses the Magdeleine bank with some rapidity until $3\frac{1}{2}$ or 4 hours flood, and inclines towards the inner banks, which renders the entrance to the channel difficult with a head wind; but under all circumstances there is nothing to prevent a vessel getting up as

far as Taret. The beginning of the ebb is weak, but as soon as the banks begin to uncover its rate rapidly increases.

The COAST.—From Maisy point the eastern point of entrance to the Grand Vay, to Percée point, the distance is about 6 miles, and the coast between trends to the E.S.E. to within a mile eastward of Grand Camp church; it then suddenly rises, and a perpendicular chalk cliff commences, about 400 feet high, which may be seen 12 or 15 miles off. The land above the cliff is apparently level, without any remarkable object on it, except the church tower of St. Pierre du Mont, which stands in the midst of a clump of tall trees.

From Percée point, cape Manvieux bears S.E. by E., distant $11\frac{1}{2}$ miles, and nearly as far as St. Côme-de-Fresné chapel, at $1\frac{1}{2}$ miles to the eastward of the cape, the land when seen from the offing appears nearly a level plain, upwards of 400 feet above the sea, overtopped only by the church towers and the trees which surround the villages. When nearer the coast presents a variety of aspects; the chalky cliffs continue to about a mile south-east of Percée point, and thence as far as the guard-house at St. Honorine, the shore is low and sandy and bounded by low sand hills, in front of which is a beach of muddy sand and shingle about 2 or 3 cables wide at low water. Between the guard-house and the chapel of St. Côme, the shore is precipitous and composed of high cliffs of rock and brown clay, intersected by narrow valleys. Vessels of large draught may approach to within a mile of the coast between Percée point and cape Manvieux without danger.

To the eastward of the chapel of St. Côme-de-Fresné the appearance of the coast changes from the before-mentioned brown clay cliffs to gracefully undulating hills, covered with rich cultivation, and rising with a gentle slope behind the shore as far as the left bank of the river Orne. From St. Côme de Fresné to St. Aubin point, a distance of 8 miles, the coast trends to the E.S.E., and from the latter point it trends S.E. $\frac{1}{2}$ S. $5\frac{1}{2}$ miles to the mouth of the Orne. In the vicinity of Courseulles the shore is low, and composed of sand hills, except in front of the village of St. Aubin, where it changes its direction to the south-eastward.

The highest parts of the Calvados flat are joined to this part of the coast, and render the approach to it dangerous. The coast may be easily recognized from seaward by the clumps of trees surrounding the villages, and by the church towers which surmount them. Tailleville hill, rising to the south-eastward of Courseulles, is remarkable, as is also the hill at Amfreville, which is upon the eastern bank of the Orne, and not far from the mouth of that river. In front of most of the villages along the coast there exist, between the low water rocks, small deposits of muddy sand and gravel, called Naus or Anneaux, which afford no shelter with northerly



winds, but where the inhabitants of the villages fit out large fishing boats at the commencement of the fine season of 8 to 10 feet draught when laden. During the winter these boats remain either at Courseulles or in the Orne. Between St. Aubin point and Lyon the shore is rather high, and the other parts of it are composed of sand hills.

Grand Camp is a small village built on the shore and backed by a small hill. The inhabitants are either fishermen or sailors, and the former fit out about forty boats of from 12 to 25 tons burthen, and of from 5 to 10 feet draught; these boats are moored to buoys on a small sandy beach, and are protected from the high sea, when the wind blows upon the shore, by the Grand Camp rocks. Two of the pilots for the Gand Vay reside in the village, and eight at Isigny. The small *fixed* white light (noticed in page 50) exhibited on the shore in front of the houses is kept up at the expense of the fishermen.

A Life Boat is stationed here.

Pointe de la Percée forms the most northern promontory of the chalky cliffs, 400 feet high, which border the shore for about a mile to the eastward of Grand Camp to a mile south-east of the point. The point projects but little to the northward, and is only remarkable by the change in the direction of the coast.

A flat of sand and gravel, divided into several parallel banks, extends about E.N.E. three-quarters of a mile from the point, and the eddies occasioned by these banks, which lie directly across the tidal streams, cause a sort of race on a weather tide; but the race is not dangerous to decked vessels.

Port-en-Bessin.--The coast for $7\frac{1}{2}$ miles to the eastward of St. Honorine is composed of high cliffs of rock and brown clay, and intersected by narrow valleys, some of which descend down the cliffs to high-water mark at springs, although the greater part do not reach lower than half-way down. The most considerable of the valleys which do not reach the sea is that of port-en-Bessin, lying S.E. $\frac{1}{4}$ E. $7\frac{1}{2}$ miles from Percée point, and the opening to it is about 130 yards wide between two cliffs, of Oxford clay, from 300 to 400 feet high. The valley suddenly widens within the opening and forms a kind of circus, more than a mile in diameter, the bottom being a level plain from 15 to 20 feet above high water, and almost entirely surrounded by gently sloping hills.

The shore in front of the valley is composed of a steep beach of small pebbles and shingle, and affords, when the sea is smooth, a good grounding place for fishing boats, which are hove up out of the reach of the high sea by capstans. The approach to this beach is between a break in the rocks which border the shore, and which form a sort of creek 140 yards

which is a very common one. The water is partially filled with small fish, and the bottom is covered with a layer of mud. The water is very shallow, and the fish are very numerous. The water is very shallow, and the fish are very numerous.

Small fishing boats are used. The fishing boats are used annually at this point. The fishing boats are used annually at this point. The fishing boats are used annually at this point. The fishing boats are used annually at this point.

A Life Boat—a station at this point.

LIGHTS.—A fixed white light is shown in port-et-Bessin at an elevation of 30 feet above high water and is visible 10 miles; a red and white light is also exhibited S.W. $\frac{1}{2}$ S. 75 yards from the shore light at 100 feet above the water and appearing red when there are less than 10 feet water in the banks within the point. It is then visible at the distance of 5 miles, when at night it is seen on each side of the centre of the channel. Both lights are navigational and of the fourth order: when in use they show the location of the entrance.

Tides.—It is high water, full and change, at port-et-Bessin at the 27th day; equinoctial springs rise 25 feet; ordinary springs 20 feet; neaps 15½ feet.

ARROMANCHES, a pretty little fishing village used as a watering-place by the inhabitants of Bayeux, stands upon the sea-shore at the entrance of a wide valley three-quarters of a mile to the eastward of cape Manvieux, and as it may be seen from a great distance seaward it serves to point out the position of the cape, which otherwise has little to distinguish it but its height, and the steep cliff in which it terminates. The inhabitants of the village fit out small half-decked vessels which they shelter from the high sea by hauling them, by means of capstans, upon a shingle beach much resembling that at port-et-Bessin. A rocky shore, which uncovers nearly half a mile out at low water and forms a point advancing in an easterly direction from cape Manvieux, arrests the sea during northerly winds, and diminishes the violence of the surf on the beach, which is otherwise much exposed.

PLATEAU de CALVADOS.—This rocky flat commences a short distance to the eastward of Arromanches, and extends 14 miles to the eastward along the coast, as far as Lyon. The parts of the flat which uncover at low water are, the Calvados rock, from which the name of the flat is derived, the Roches de Ver, the Esbarts de Langrune, and the Roches de Lyon. A tradition is maintained in the country that a forest of chestnut trees, called the forest of Haute-fouille, originally covered the rocks which dry at low



water, between Bernières and Lyon, and that its sudden destruction took place about 300 years since. It is also said that roots of chestnut trees are found in the fissures of these rocks, and that they are so difficult to extract, and the wood so hard that it blunts the best tools.

The north-west end of the flat lies N.E. by E. $\frac{1}{4}$ E. one mile from the western edge of the Calvados rock, and is marked by a black buoy moored half a mile N.N.W. of it, the outer edge, which is steep to, preserves a distance of from $1\frac{1}{2}$ to $2\frac{1}{2}$ miles from the shore as far as Essarts point, (the north-east extreme of the flat,) which lies 3 cables to the westward of the line, on which the spires of Langrune and Douvres churches are seen in line bearing S.W. by S.; Ver lighthouse W. $\frac{1}{2}$ N.; and the tower at Oyestreham, at the entrance of the river Orne, S.S.E. From Essarts point, which is $2\frac{1}{4}$ miles from the shore, the edge of the flat turns sharply to the southward, and approaching the coast within a mile, continues at that distance until it is lost beneath the sands which dry to the westward of the mouth of the river Orne. Essarts point is the most dangerous part of the flat, as it has only 4 feet water upon it, and rising suddenly from the depth of 20 feet, it occasions a change in the direction of the streams, and forms a race during the springs on a weather tide. There is but little water on the other parts of the flat, and the surface of the rocks being uneven, a high sea breaks upon them when the wind blows hard from the northward.

Buoys.—A black buoy is moored in 7 fathoms N.E. by E. $\frac{3}{4}$ E. one mile from Essarts point, and lies with Langrune and Douvres church spires in line, and the outer black buoy at the entrance of the Oyestreham channel S.S.E. $\frac{1}{4}$ E. 6 miles. Both the buoys marking this flat are liable to drift, therefore their position cannot always be depended upon.

Calvados Rock lies $1\frac{1}{3}$ miles from the shore, in a N.E. by N. direction from St. Côme-de-Fresné chapel. It is about half a mile long, in an east and west direction, and 3 cables broad, and its western part, which is the highest, uncovers 3 feet above the lowest tides. The above chapel in one with the spire of Bazanville church, which stands on the top of the hills 2 miles inland, bearing S. $\frac{1}{2}$ W., leads 3 cables to the westward.

Anchorage.—A small anchorage with good holding ground, named Fosse d'Espagne, lies midway between Arromanches and the Calvados rock, in a small elbow formed by the steep western side of the Calvados flat. The best position to anchor is in about 20 feet water, with Crépon church tower seen between those of Mévaisnes and Asnelles; and the tall spire of Bernières in line with the houses of Ver hamlet which stand nearest Ver lighthouse. The soundings deepen rather suddenly outside the Calvados flat; but there is no good anchorage ground at a less distance

than a mile from its deep western edge, or than 2 miles from its eastern edge.

Directions.—Vessels of large draught may approach to about a mile of the shore even at low water, between Percée point and cape Manvieux, but it would be imprudent to stand in so near with northerly winds. Coasters keeping close in, with off-shore winds, should be aware of the gusts which proceed from the valleys. Good holding ground will be found at 2 or 3 miles off the coast, where vessels sometimes anchor to stop tide. The tides follow nearly the direction of the shore, and their greatest strength, at springs, does not exceed $3\frac{1}{2}$ knots.

In approaching the Essarts point of the Calvados flat from the eastward keep to the northward of the line on which Ver church tower is in line with the clump of trees at Epine,* bearing West until Langrune and Douvres church spires are in line S.W. by S. In rounding the point from the eastward, keep Lyon church tower open to the westward of the western house of St. Aubin-d'Arquenay village, bearing about South until the line of Langrune and Douvres church spires in one is crossed.

LIGHT.—Pointe de Ver lighthouse stands 800 yards inland upon the slope of a small hill $4\frac{1}{4}$ miles to the eastward of cape Manvieux, and exhibits a *fixed* white light, varied by a bright *flash every four minutes*. The light, which is of the third order and elevated 138 feet above high water, is visible in clear weather from a distance of 14 miles. The flash is preceded and followed by a short eclipse, but the light does not quite disappear within the distance of 6 miles. The lighthouse may be easily recognized in approaching it from East or West; but between the bearings of S.E., round southerly, and S.W., it is difficult to distinguish, being backed by the land.

Ver light was established for the purpose of giving warning of approach to the Calvados flat, and to afford means of avoiding that danger; but vessels with southerly winds, after passing cape Barfleur and bound to Le Havre, try and sight this light at 9 or 12 miles distant; thence they steer for the lights on cape de la Hève, which will soon appear to the eastward. By this means they avoid making the land too far to the northward of Le Havre, which might delay their entrance into that port.

PORT de COURSEULLES.—This small tidal harbour, situated nearly $2\frac{1}{4}$ miles to the eastward of Ver lighthouse, is, properly speaking,

* This clump of trees, formed of four or five large elms, is very conspicuous, and being used as a landmark the local authorities are careful to preserve it. It stands at the foot of the hills between Ver lighthouse and the Château de Vaux, at nearly a quarter of a mile from the shore in a N.E. by N. direction from Ver church.



only a narrow channel through which the waters of the Seulle are conducted by intercepting the ancient course of this little river by means of a dam. The channel is about 2 cables long and terminates in a lock, which communicates with a floating basin, intended to sluice the harbour. The entrance to the harbour is 148 feet wide, and is formed by two jetties of unequal length running parallel with each other; the western jetty is the longest. Vessels, both foreign and native, are constantly arriving, and large boats of 80 tons are employed in the herring fishery.

The bottom of the channel between the jetty heads is 2 feet higher than the sill of the lock, and $12\frac{1}{2}$ feet above the level of the lowest tides, and the sand at the foot of the jetty heads is 2 feet higher than the bottom of the channel; thus, in ordinary weather, at high-water springs, the harbour will only admit vessels of about 9 feet draught. In 1857 works for the improvement of the harbour were progressing, and in addition to a continuation of the jetty, a large basin was in course of construction. At that date a vessel of 150 tons burthen entered the harbour.

The waters of the Seulle are neither sufficiently rapid or abundant to form or maintain a deep straight channel in the sandy beach which extends out half a mile in front of the entrance, and which terminates to seaward at the Ver rocks, the Germain rock, and the Essarts de Bernières. The channel is distinctly marked as far as 2 cables outside the jetties; beyond that distance the water spreads out and follows a variety of directions. Near the harbour the borders of the channel are marked by three black buoys, one on either side, and the third, which is the largest, is placed outside, where the channel ceases to be well defined; these buoys are moored securely in order that vessels approaching the harbour with a head wind may use them for warping. To do this, they should contrive to get up to the outer buoy a full hour before high water, that they may have time to warp into the harbour during the remainder of the flood. The sea is smooth at the entrance with southerly winds; and if the ebb prevents their entering, they may remain aground without danger.

The sand accumulates upon the beach to the westward of the entrance, and forms banks often sufficiently high to prevent any access to the western jetty head, except by the channel itself. This disposition of the sand renders it extremely difficult, and even dangerous, to enter the harbour with stormy winds between West and N.N.W., for vessels will then have the wind, the heavy sea, and the flood tide on their broadsides. Winds between N.N.E. and E.N.E. cause much sea at the entrance, but at that time they may always get in at high tide, if they are of a suitable draught.

LIGHT.—A *fixed* white light of the fourth order is exhibited all night at 30 feet above high water, from the extremity of the west jetty at

Courseulles, and is visible in clear weather 6 miles; but the fogs and mist are said frequently to conceal it.

A *fixed green* light is exhibited at 25 feet above high water from the east pier at Courseulles, and should be visible in clear weather from a distance of 4 miles. This light is only exhibited when there are $6\frac{1}{2}$ feet of water in the channel.

Tide Signals.—The depth of water in the channel will also be signalled from a mast and yard erected on the east pier, commencing at $6\frac{1}{2}$ feet.

Directions.—The mound and the trees at Tailleville, the fine spire at Bernières, and Ver lighthouse, are all excellent objects by which the position of Courseulles may be determined from a distance. With northerly winds a vessel should run for the harbour either between the Germain rock, which uncovers 4 feet at the lowest tides, and the Essarts de Bernières, or between the Ver rocks and the Germain, which are separated from each other by channels, through which, with the wind on the shore, it is advisable to pass, to avoid the high sea which sometimes breaks upon these rocks.

Banville church tower in one with Courseulles light, bearing S.W. by W. $\frac{1}{4}$ W., will lead to the entrance of the harbour between the Germain and the Essarts de Bernières. Béný church spire in line with the small church tower at Courseulles, S. $\frac{1}{2}$ E., will lead between the Ver rocks and the Germain, and a small distance to the westward of the Valette rock, upon which the sea breaks; but in running for the harbour from this side Béný spire had better be brought in one with a little mound, upon which there is a small battery, bearing south, and it will lead a cable to the eastward of the Valette, and the same distance to the westward of the Marguerite rock, (which is awash at low water and lies at the south-western extremity of the shelf of rock separating the Courseulles deep from the Anneau de la Marguerite) and direct to the outer buoy; the mound stands upon the shore a cable to the eastward of the east jetty. The Marguerite rock is marked by a black buoy with staff and ball, placed a little to the southward of it.

Vessels may anchor in safety during several hours in ordinary weather either in the Anneau de la Marguerite or in the Fosse de Courseulles, and wait until there is sufficient depth for them to enter Courseulles harbour. The layer of mud covering the rock at these entrances is both deep and stiff.

Tides.—It is high water, full and change, at Courseulles at 9h. 7m.; ordinary springs rise 20 feet, neaps $15\frac{1}{2}$ feet.



EMBOUCHURE de l'ORNE.—The river Orne has its source near Séz, and thence it trends in a north-west direction till it enters the department of Calvados, where it turns to the N. by E., passing Caen ; here it becomes navigable and, at 9 miles below the town, finds its way into the sea between the sand hills of Siége and Merville points, at about 10 miles to the eastward of Courseulles and a mile to the eastward of Oyestreham church. At low tide the waters of the river thread their way through a winding channel upon an immense collection of sand, which has formed itself at the entrance, and dries 2 miles out from the shore. At ordinary springs vessels of 12 feet draught can get up to the grounding places at the entrance. The lower course of the river, its entrance, and the adjacent parts of the channel, are incumbered by banks, which change their height, shape, and position almost every tide ; and amongst which it would be very imprudent to venture without a pilot, for to ground on them would almost always involve the loss of the vessel.

The parts of the passage channel which change the least are those lying towards the outer border of low-water mark ; they are covered during the neaps, and are only uncovered a short time at the springs. The banks formed on this part of the shore are named by the pilots *battures*, and with strong northerly winds there is a high sea upon them on the flood, and breakers on the ebb. The high banks named the Oiseaux, on the western side of the entrance, are extending to the eastward, and slowly forcing the channel and its entrance in that direction ; and it was stated, in 1841, that within thirty years it had advanced nearly half a mile.

PORT de CAEN is situated 9 miles from the sea, at the confluence of the rivers Orne and Odon, and its quays extend 1,057 yards along the banks of both rivers. The port fills with mud during the summer, but in the rainy season it is cleared out by the freshets. Since the opening of the canal between this port and Oyestreham, commerce has been on the increase, and in the year 1870, 894 vessels, amounting to 134,894 tons, arrived at Caen, of which 276 vessels and 52,640 tons were French, and 510 vessels and 55,790 tons were British. The cargoes of the latter are generally coal, with a few exceptions of cement, railway material, manure, and even wheat. The exports consist of Caen stone, flour, barley, colza oil, &c. In 1866 the population was 41,564.

Sailing vessels of 11½ feet draught may now proceed up to Caen through the Oyestreham canal. Those drawing 8 feet and steam vessels, can still use the route up the river Orne to the quays at Caen during ordinary springs, and those of 9 feet at the equinoxes. If deeply laden, and unable to reach the quays (which, however, rarely happens now, as sailing vessels go up

the canal), they are lightened at the grounding-places at the mouth of the river ; and when it blows hard from the southward they can be towed up by horses, procured a mile within the entrance, at La Roque point. The principal grounding-places are those at Merville and Siège points ; the latter is the best sheltered, but it is often invaded by sand. That at Merville point is not subject to this inconvenience, but it has only the Oiseaux bank to shelter it from northerly winds ; vessels are much disturbed here with a N.W. wind when the tide is high, and strong winds between North and East cause the anchors, which are buried in the sand, to drag.

OYESTREHAM HARBOUR.—To remedy the numerous difficulties presented to navigation at the entrance of the river Orne, and its circuitous course below Caen, a fine tidal basin, with stone quays on either side, is built upon the shore at $1\frac{1}{2}$ cables to the eastward of Oyestreham battery, and communicates directly, by means of a canal, with that part of the port of Caen which is upon the river Odon. The canal is especially designed for sailing vessels, and those of $11\frac{1}{2}$ feet draught can proceed through it up to Caen. A tug can be obtained at Oyestreham to tow vessels up. The basin is 320 yards long and 100 yards broad, and forms a small harbour in the midst of sand hills, having for its entrance a channel 400 yards long and 40 yards wide, enclosed between two jetties of unequal length opening into the outer part of the channel into the Orne. These jetties are built up to high-water mark at neaps, and the western jetty is the longer. This basin will admit vessels drawing 17 feet water. A communication is made between the basin and the canal by means of a lock, through which vessels may enter at high water.

Buoys.—Two red buoys mark the western side of the channel leading to the entrance of Oyestreham harbour and the mouth of the Orne, and four black buoys the eastern side.

The outer red buoy lies about half a mile from the extremity of the north jetty ; the inner red buoy is moored a little to the eastward of the extremity of the same jetty.

The outer black buoy bears N. by E. $\frac{1}{2}$ E. nearly $1\frac{1}{4}$ miles from the extremity of the north jetty, and may be passed close to on its west side. The second black buoy is moored nearly half a mile from the same jetty, and the channel lies between it and the outer red buoy. The third black buoy lies about $1\frac{1}{2}$ cables E. by N. $\frac{1}{2}$ N. of the north jetty head. The fourth black buoy, which is only useful to vessels entering the channel leading to Siège point, lies about half a cable east of the south jetty head.



Pilots.—There are several pilots at Oystreham, and within the river at Sallenelles, and it is said that they will meet a vessel, even during northerly gales, at a quarter of a mile out from the harbour's mouth.

Caution.—The channel leading to the entrance of Oystreham harbour is liable to change; the depth however may be calculated approximately by deducting 8 feet from the height of tide at Havre.

A Life Boat is stationed at Oystreham.

LIGHTS.—Two *fixed* white lights are exhibited on the western side of the entrance to the river Orne, bearing N.E. $\frac{1}{2}$ N. and S.W. $\frac{1}{2}$ S. 1,203 yards from each other. The southern or upper light is shown from a window on the northern face of the church tower at Oystreham, at 92 feet above high water, and may be seen at the distance of 10 miles. The northern or lower light is hoisted every evening on a mast erected on the sand hills near the shore at a short distance to the westward of Oystreham battery; it is elevated 39 feet above high water, and visible 6 miles.

A small *red* tidal light of 4 miles range is also exhibited at 66 feet from the extremity of the north end of the western jetty now extending at Oystreham harbour; it is lighted at 3 hours before and extinguished at 3 hours after high water. A *green* light is shown from the end of the east jetty. There is also a *green* tidal light shown from the eastern side of Oystreham channel, from 3 hours before to 3 hours after high water. The channel leading to Siège point passes near the end of the cross boom, and the *green* light is intended to point out that danger. A bell is sounded in foggy weather from the west jetty.

Directions.—The most favourable winds for entering Oystreham harbour and the river Orne are those between N.W., round northerly, and East. When they are moderate the sea is not heavy upon the shelves, and by crossing them at half or three-quarters of an hour before high water, a vessel will have time to arrive at the grounding places, if intending to enter the river, before the ebb begins; but with strong winds from those quarters the pilots cross the shelves at high water. Winds from West to S.W. are also favourable for entering the river. With the wind from the latter quarter it will be necessary to work up, and there will be sufficient room for a good reach in the channel, but the shelves should be crossed a full hour before high water. A vessel should not attempt to enter with winds between S.S.W., round southerly, and East, if they blow strong, but if moderate, short tacks may be made in the channel, but if surprised by the ebb, she must run out immediately for fear of grounding, which is always dangerous.

At night the entrance ought not to be attempted by strangers without a

pilot, as the banks are so continually changing that the two lights are but of little use, excepting to point out the position of the port.

Tides.—It is high water, full and change, in Oyestreham harbour, at 9h. 38m. springs, rise 21 feet, neaps 16 feet. The bottom of the channel, abreast the certain beacon, is 8 feet above the level of low-water equinoctial springs, and the tide rises there 16 or 17 feet at ordinary springs, 18 or 19 feet at the equinoxes, and 7 or 8 feet at neaps. With strong westerly winds for several successive days, the water falls but little, and rises above the highest point just mentioned; and the contrary effects are produced by easterly winds. The bottom of the channels between the shifting banks, as far as the grounding-places at Merville and Siège points, is nearly on a level with that of the channel abreast the beacon, and vessels of 12 feet draught may arrive up to them during ordinary springs, and of 13 and 14 feet draught at the great spring tides in the rainy season.

RADE de CAEN lies about 3 miles N.N.W. of the entrance to the river Orne, and affords good anchorage with winds between S.S.E. round southerly, and N.N.W. for vessels waiting a suitable time of tide to enter the river; but it would be dangerous to be caught there with winds from the opposite direction.

The eastern limit of the road is on the meridian of Oyestreham battery and it extends northward as far as the line on which Bernières church spire is in line with the houses standing on St. Aubin point, and its southern limit is the same church spire on with the small church tower at St. Aubin. The pilots usually place large vessels between these limits in about 6 fathoms water, with Luc church tower open half a point southward of the church spire at Béný where they can weigh and stand off-shore if the wind should veer round and blow strong from the northward.

EMBOUCHURE de la DIVES.—The entrance to this river lies about E. by S. 5 miles from the mouth of the Orne, the intermediate coast being composed of sand hills, several of which are sufficiently high to be recognised at the distance of 5 or 6 miles. A sandy beach, about half a mile wide at low water, borders the coast. This river can only be entered during the day, and with no swell will admit vessels of 11 or 12 feet draught at springs, and 7 feet at neaps; but with much fresh water in the river, and when channel and berths are washed out, or during equinoctial tides, vessels of 15 feet draught may enter with a smooth sea.

At all tides vessels lie upon the grounding-places at the entrance of the river, and are well sheltered by Cabourg point. They are safe, although



in an uncomfortable position, for the bottom being stiff they cannot stand upright. Those that only remain one tide are placed on the left bank of the river, and those that take in or discharge cargo alongside a small quay, or near the steep bank of the Mauvais-Pas, at the foot of a hillock, named Balise de Dives, at the entrance.

The waters of the Dives run out upon a sandy beach, which dries a mile from the entrance. They form two channels, the deeper of which trends N. by E. $\frac{1}{2}$ E., half a mile from the entrance; it then inclines more to the north-east, and continues in that direction as far as the outer edge of the beach, which is abrupt, and causes a heavy sea at the entrance of the channel with strong winds between North and West on the flood, and breakers as soon as the ebb stream begins to gain strength. It is through this channel that the pilots conduct coasting vessels, and a red buoy marks the position where it changes its direction.

Two wooden beacons mark the channel near the entrance of the river; that to the southward is placed upon its western edge at the foot of Cabourg point, and the other stands about a cable farther to the northward on its eastern edge.

The beacons are seldom moved, but the buoy is shifted whenever the course of the channel has undergone any decided alteration.

LIGHTS.—Two *fixed red* lights are established on the east side of the mouth of the river Dives, and when in line mark the fairway into the channel so long as there is a depth of 6 feet. They are situated N. $\frac{3}{4}$ E. and S. $\frac{3}{4}$ W. 195 yards apart, and elevated respectively 148 and 10 feet above high water, (the lower being shown from a moveable wood work) and visible in clear weather from distances of 9 and 7 miles.

Directions.—The most favourable winds for entering the river Dives are those from the northward, but it is necessary to await the moment of high water whatever the vessel's draught. During springs, however, with a smooth sea, small vessels may venture in at one hour after high water, if there be wind enough for them to run over the tide. With off-shore winds the entrance should only be attempted by small vessels, and in turning to windward provision must be made for the heavy gusts which come down from the high land through the openings of the valleys.

The pilots have no boats sufficiently large or safe to board vessels outside the entrance in bad weather. If a vessel, therefore, of suitable draught should be compelled to enter the river with a strong northerly wind, she must contrive to arrive at the hour of high water at a position about $1\frac{1}{2}$ miles from the shore on the meridian of the Balise de Dives. From thence a S.S.W. course will lead about half a cable to the eastward of the red buoy, and when abreast it steer for the space which separates

the two beacons, where a pilot will be met with to conduct to the grounding place.

Anchorage.—Good anchorage will be found off the entrance to the Dives, at $1\frac{1}{2}$ or 2 miles from the shore, where a vessel may remain until there is sufficient water in the channel. With a turning wind into the river, it will be necessary to anchor in order to retain a favourable position; for the flood stream is here considerably increased by the proximity to the river Seine, and a vessel remaining under sail might be drifted to leeward. However good the holding ground may be along this coast, no vessel should remain at anchor longer than the weather continues fine, and the wind blows off shore: should it come from seaward, and there should be no certainty of entering the river at high water, it will be necessary to weigh without delay and seek refuge either at Le Havre or Honfleur.

Tides.—It is high water, full and change, at the entrance of the river Dives at 9 h. 39 m., springs rise 21 feet, neaps 16 feet, but in the shoalest part of the channel abreast the eastern beacon, (where the bottom is 8 feet above the level of the lowest tides,) the water rises about the same as in the river Orne, viz., 16 to 17 feet at ordinary springs, 18 to 19 feet at the equinoxes, and 7 to 8 feet at neaps.

EMBOUCHURE de la SEINE.—The low coast from the river Orne, composed of sand hills, terminates upon the left bank of the river Dives, and the land suddenly rises upon its opposite bank. Beuzeval hill, which commands the entrance to the Dives and cape de la Hève, which bears N.E. distant $13\frac{3}{4}$ miles from the hill, form the most western of the high lands between which the estuary of the Seine is comprised; and an imaginary line drawn through Beuzeval point and cape de la Hève may be considered the boundary between the sea and river navigation. In fact this line is nearly the extreme western limit of the accumulation of sand and mud brought down by the waters of the Seine, which has formed dangerous shoals across the mouth of that river, and no vessel of large draught should pass to the eastward of this limit, nor should smaller vessels, except during high tides, and when bound to Le Havre, Honfleur, or Rouen. It is also at this limit that the flood stream, which runs into the river, begins to acquire its strength.*

The Amfard and Ratier banks divide the mouth of the Seine into three channels of about equal breadth, which at low water have no issue towards the east, and abut on the uncovered and shifting sands within the river. In these channels the stream runs 7 and 8 knots at the springs, and 4 and 5

* See Admiralty charts:—Trouville to Dieppe, No. 2,612; scale, $m = 0.5$ of an inch; Barfleur to cape d'Antifer, No. 2,613; scale, $m = 0.5$ of an inch; and entrance of the Seine, No. 2,680; scale, $m = 2$ inches.



knots at the neaps, and vessels of large draught should avoid approaching them during the flood, for they would be rapidly carried amongst the sands, and of a certainty lost if they should have the misfortune to ground on them. Neither can they be brought up by anchorage, for the anchors will not hold in the shifting sand, and it will be impossible to resist the violence of the stream, which increases its velocity in advancing to the eastward.

The inner part of the estuary is encumbered with an immense mass of shifting sand, which dries when the sea retires, and through which the tidal streams and the waters of the river have forced a channel, the position of which is so changeable that the interval of a few days only is sufficient to transport it from one bank of the river to the other. Vessels will be exposed to great danger if they attempt this channel without the assistance of the pilots from Quillebœuf who are especially appointed to conduct both sailing and steam vessels above Le Havre and Honfleur. It is the duty of these pilots to watch the changes that may take place in the position of the banks, and to mark the actual direction of the channel by beacons. Their principal stations are at Le Havre and at Honfleur, and they are always in sufficient number at these places to satisfy the wants of vessels requiring them. Vessels also destined for the interior of the Seine can procure at either of these places steam-tugs to take them speedily past the dangerous parts of the lower Seine, and they will then avoid all the inconveniences which may result from a change of wind.

The bed of the river being inclined, it checks the flood stream for some time at the commencement of the rising tide, but as soon as the accumulation of water permits this stream to overcome the obstacles opposed to its course, it precipitates itself into the channels between the banks, and loses little of its rapidity until these banks are entirely covered; it is then that the river becomes navigable. The ebb stream in summer has rather less speed than the flood, but it runs longer; during the rainy season and at the melting of the snow it has in general more strength than the flood.

The channel of the Seine undergoes such frequent and extraordinary changes that a description of it would be entirely useless to mariners. We will therefore only give some general extracts which are copied from the "Remarks on the Navigation of the Seine," by Mons. Bailly, Marine Surveyor:—"The Seine is subject to the phenomenon of the Mascaret, or Bore, which by the mariners of the place is named the flot. It takes place as soon as the tide begins to rise, and may be known by a sort of roller, which extends from one bank of the river to the other, and advances with greater or less rapidity according to the range of the tide. It is always accompanied by a loud noise, which announces its approach, and is followed

by the undulations occasioned by the reflux of the waters of the river. At Quillebœuf it attains its greatest strength, but it extends far beyond, and is sometimes to be found above Rouen.

"The greater number of accidents that happen to vessels navigating the Seine may be attributed to this Bore; for should a vessel from any cause take the ground, it frequently happens, especially during the springs, that when the flood reaches her she is thrown on her broadside and buried in the sand set in motion by the strength of the stream, and as it is then impossible to send any assistance she becomes, in almost every case, a lost vessel. The number of masts sticking up in various parts of the river testify that these misfortunes are not unfrequent, and the greatest attention should therefore be paid by commanders of vessels ascending the river until they arrive at Quillebœuf, where they can be secured to the quay before their vessels are exposed to the danger of grounding in the channel. If they cannot arrive at this position before the end of the flood they must hasten to take shelter either at Honfleur or Le Havre, whilst there is yet sufficient water in the narrow channels. Generally speaking, they should not attempt to ascend or descend the river without leading winds or in tow of a steam vessel.

"Sailing vessels at Le Havre or Honfleur intending to ascend the Seine should leave those ports directly they float, and with a leading wind they may expect to reach Quillebœuf before the ebb begins to be felt. This navigation, however, can only be undertaken with safety during the springs, for at the neaps the depth of water is not sufficient for vessels of much draught to navigate the lower part of the river. Most vessels waiting at Le Havre for the springs to ascend the river, quit the harbour on the ebb preceding the flood which is to take them up to Quillebœuf, and anchor in the Petite Rade; by doing so they avoid] the loss of time which the getting out of the harbour would occasion with westerly winds, and do not run the risk of losing a favourable tide."

Tides.—Under exceptional circumstances of tide, a vessel drawing 23 feet water can get up to Rouen, yet under ordinary circumstances it is not safe to count on more than 17 or 18 feet water, between Havre and Rouen, at springs, and 14 feet at neaps.*

Caution.—To show the danger attending the Bore; on the 8th February 1871, H.M. gunboat *Pheasant*, while at anchor off Quillebœuf lost a bower anchor and 30 fathoms of chain. The vessel at the time was riding to the ebb, which was running at the rate of 4 or 5 knots an hour, when the Bore, without any warning, came up the river in two waves of from 6 to 8 feet in height, and travelling at the rate of 6 to 7 knots; this

* Chef du Pilotage, river Seine, 1879.



caused the cable to part, but steam being ready, the vessel was soon under control, and no further damage was done.

In the Seine, there is no interval at all of slack water between the ebb and flood tides, and the moment the Bore had passed, the flood was making up at the rate of 6 or 7 knots. After the flood tide, there is always some interval of slack water. The Bore appears principally at the time of springs, but does not take place with any regularity, so it is impossible to know beforehand if there will be one or not, and they vary greatly in size.*

Banc de Seine.—The deposits of sand and mud washed down by the river Seine extend beyond the shoals at the river's mouth, and form an extensive submarine slope, agreeing in shape with the bank bordering the shore from port-en-Bessin to the meridian of the Dives. This slope, upon which the soundings increase slowly and regularly towards the offing in a direction perpendicular to the coast, occupies the whole breadth of the mouth of the river, and terminates to the northward on the parallel of cape de la Hève; but on the parallel of Le Havre, and projecting $15\frac{1}{2}$ miles to the westward of that town, lies a narrow shoal named Banc de Seine, which is steep to on its southern side, and slopes gradually to the northward. This bank is not dangerous, having 7 to 9 fathoms on it, but the streams cross it obliquely and cause eddies upon its steep edge, where the sea is high during northerly gales on a weather tide.

The Seine bank and the deep to the southward of it, called by the pilots the Parfond, may be useful in establishing the position of a vessel during fogs or falls of snow, when the navigation can only be carried on by means of the lead. From the western extremity of the bank, in 9 fathoms, cape de la Hève lighthouses bear E. by S. $\frac{1}{4}$ S. distant 14 miles, and Ver lighthouse S.W. by W. $\frac{1}{4}$ W. 13 miles.

The principal banks obstructing the mouth of the Seine are, the Trouville, the Ratier, the Amfard, the Hauts de la Rade, and the Éclat, the higher parts of which uncover at low water; but as the two latter lie near the northern shore, and out of the track vessels should follow when bound for ports in the Seine, the description of them will be reserved until the right bank of the mouth of the river is described, briefly noticing that in 1855 it was found that the Hauts de la Rade and the Éclat had not undergone any sensible alteration since 1834, but the banks to the southward and eastward of them had altered considerably.

Banc de Trouville.—This bank of muddy sand, the south-westernmost of the shifting banks at the mouth of the Seine, is about $2\frac{1}{2}$ miles

* Lieutenant H. W. Rochfort, H.M.S. *Pheasant*, 1871.

long in an E. by N. and W. by S. direction, and from a half to one mile broad, with general depths of 3 to 6 feet water. A portion of its surface about three-quarters of a mile long and one cable broad, extending in a N.E. and S.W. direction, and lying 4 cables from the shore abreast of Hennequeville, dries from one to 4 feet at low water springs. The sea is exceedingly heavy upon this bank, with winds between W.S.W., round westerly, and N.N.E.

The Trouville is separated from the shore by a narrow channel, the entrance to which is on the parallel of Trouville church. It is possible to enter the Seine by this channel, which in 1878 had depths of 14 to 20 feet, clayey mud; vessels can anchor in 14 feet abreast the mouth of the Touques, during an unfavourable tide. The streams follow the direction of the channel, and during calm weather, the flood at the springs runs about $5\frac{1}{4}$ hours, and ends 15 or 20 minutes after high water at Le Havre; its greatest speed is about 4 knots towards half flood. The ebb is rather weaker, and follows in an opposite direction.

Banc du Ratier, lying abreast Villerville at $1\frac{1}{2}$ miles from the shore, is united at its western side to the Ratelets, and they form one of the most dangerous shoals at the mouth of the Seine. The bank is of an irregular shape, and its surface, which dries from one to 12 feet above the lowest tides, is covered with a large quantity of stones and rolled shingle, but its base is a mass of compact brown clay, and consequently not subject to change. That part of the surface which uncovers is a little more than 2 miles long in an east and west direction, and forms a shelter from the flood to the banks of shifting sand lying to the eastward of it. From its western extremity, which terminates in a point, cape de la Hève lighthouses bear N. $\frac{3}{4}$ E. $5\frac{1}{4}$ miles.

This bank covers towards half flood and the sea runs high upon it with strong winds between West and North, but with the latter wind it shelters in some degree the channel to the southward of it.*

The eastern limit of the *red* light at Deauville (page 70) passes about two-thirds of a mile westward of the Ratelets bank.

Banc d'Amfard lies about 2 miles to the northward of the Ratier, and like the latter bank its base is formed of a mass of brown clay, its surface is covered with large shingle, and it shelters the banks of shifting sand lying to the eastward. This bank uncovers about 8 feet at low-water springs, but its surface is subject to great changes, for in 1855 it was found that the stones or pebbles which constituted its inferior part in 1834 were then buried under shingle 6 feet thick, proving that the shingle on

* The relative positions of the buoys marking the Trouville, Ratelets, and Ratier banks will be better understood by referring to the Admiralty chart, than by any written description.



it is not so stationary as it seems to be on the Ratier. Small vessels may pass to the westward of this bank at low-water, by keeping the church spire at Harfleur open a quarter of a point to the westward of the guard-house on Neiges point. The passage between the Amfard and the shore to the eastward of Le Havre, is one of the entrances to the great channel of the Seine.

LEFT BANK of the EMBOUCHURE de la SEINE.

—From the entrance of the river Dives, to the hill of Notre-Dame-de-Grâce, which commands the town and harbour of Honfleur, the left bank of the estuary of the Seine trends about 15 miles E. by N., and the coast is bordered by high hills, terminating abruptly towards the sea in cliffs of brown clay and stone, and by large land slips, except in front of three valleys where the shore is low and sandy. The widest and most remarkable of these valleys is that through which the little river Touques finds its way into the sea. This valley is 2 miles wide at the sea shore, but narrows suddenly at the distance of 400 yards inland; it may be recognised from a great distance off by the village of Trouville, which is built at the foot of a high steep hill at the entrance of the river.

Vessels of more than 9 feet draught should be cautious when approaching the coast at $2\frac{1}{2}$ miles to the westward of the Touques, as a flat, with only from 3 to 10 feet water on it, extends $1\frac{1}{2}$ miles from the shore. To the eastward of the Touques the coast is bordered by uneven rocks which dry at low water, and terminate at 3 miles E.N.E. from Trouville in Villerville point. This point extends three-quarters of a mile in a N.W. by N. direction from Villerville village, and is dangerous to vessels proceeding through the channel (noticed in page 68), between the Trouville bank and the shore, but it will be avoided when passing to the northward of it, by keeping La Roque point bearing E. by S., and seen opening and shutting in with Fonds cliff. La Roque point is formed of a high white cliff, perpendicular towards the river side, and may be easily recognized, being the first point on the left bank of the Seine, which is seen to open out from Fonds cliff when coming from the south-west.

EMBOUCHURE de la TOUQUES.—The entrance to this river lies E. by N. 8 miles from that of the Dives, and is formed in a small indentation, made by the low point of Cahote, at the north-western extremity of Trouville village. A sand bank extends from this point and the highest parts of it, which are scarcely covered during the neaps, tend to divert the waters of the river, and caused them in 1838 to turn abruptly to the south-west in their outward course; but in 1855 the bank had altered its position, and the waters flowed out to the north-west from Cahote point, through a narrow channel about $4\frac{1}{2}$ cables long. In dry weather the wind drives a great quantity of sand into the channel, and into

the river; but the freshets, which are abundant during the rainy season, wash the sand outwards, and improve the entrance.

The depth in the river is about 19 feet at high-water springs between the jetties, and 14 feet at the quay, where vessels load and unload. During the neaps, those of from 11 to 12 feet draught can enter the river, and those of 8 feet can reach the quay. The breadth of the passage between the two jetties is 328 yards. Vessels of from 100 to 200 tons burthen arrive almost daily, laden with coal from England. Steam-vessels can enter the river; but those of any length, although drawing little water, should not attempt it, as the channel is very narrow, and the turning sharp at Cahote point.

Trouville, within the mouth of the river, is especially a fishing port, but it is occasionally frequented by coasting vessels, which find good shelter in it and lie afloat abreast the village. The small town of Touques is situated up the river about 2 miles above Trouville, and in 1857 vessels of 8½ feet draught could get up to the town at the springs. The river is navigable as high up as Quin-au-Coq, a small port 5½ miles in the interior, where there is sufficient water for small vessels to remain afloat.

A Life Boat is stationed at Trouville.

LIGHTS. At Deauville, west side of entrance to Touques river, stands a square lighthouse, 59 feet high (painted in alternate red and white bands), from which at an elevation of 62 feet, is exhibited a fixed *red* light, visible in clear weather from a distance of 10 miles, between the bearings of S. by W. and E. by S. ½ S.

A *fixed green* light is exhibited from the east pier (near the end) at 547 yards N. by W. ¼ W. from Deauville light, and should be visible from a distance of 7 miles.

Near the end of the west pier, at 86 yards W.N.W. from the east pier light, a *white and red* light is exhibited, visible 8 miles. This light is shown only when there are at least 6½ feet water in the channel. This light is *red* eastward of a N.W. by S. bearing.

Fog Signal.—A bell is sounded during fogs, from the north end of the east jetty.

Directions.—The most favourable winds for entering the channel leading into the river Touques are those from the westward; but vessels should not enter until half an hour before high water. With a leading wind, they may enter within half an hour after high water, as the tide is easily stemmed. At the entrance of the channel, in all weathers, there is almost a certainty of procuring pilots. A heavy sea runs in the outer part of the channel when it blows hard from the westward.



Small vessels may anchor with off-shore winds, in about 10 feet at low water, about $1\frac{1}{2}$ miles from the beach, abreast the plain of Villers, which is situated 3 miles to the south-west of the river, and remain there until the tide has risen sufficiently high for them to enter; but with the wind from the N.W. they should anchor in the channel between the Trouville bank and the coast (noticed in page 68), with the ruins of the château de Lassé in line with the houses standing on Cahote point bearing S. by W. $\frac{1}{4}$ W.; if the wind should then freshen and change to the West or S.W., they will be able to run through the channel and take refuge at Honfleur.

The tide signals are now made during the day from the earth-works of La Cahote; they will show the least depth of water found in the whole extent of the channel, commencing at 6 feet, and indicate the change every quarter of a metre (about three-quarters of a foot), according to the system of tide signals adopted for the coast of France.

PORT de HONFLEUR.—From the mouth of the Touques, the steep coast trends 3 miles to the E.N.E. as far as a small village at some elevation, named Villerville; it then bends more to the eastward for 4 miles to the hill of Notre-Dame-de-Grâce, which is one of the highest and the most conspicuous hill in the estuary of the Seine. The only part of this coast where the shore is low and accessible at high water is between Villerville and Vasoui.

This port occupies the entrance of a beautiful valley, open to the north-east, situated immediately to the eastward of the hill of Notre-Dame-de-Grâce. It is sheltered by the land on all sides, and the wind never raises a sea sufficiently heavy to render it dangerous to enter. It possesses facilities for heaving vessels down, spacious building yards in the proximity of forests which furnish sufficient timber annually for the construction of 25 to 30 vessels of the aggregate tonnage of from 6 to 8,000 tons, not including those of smaller burthen. The population in 1871 amounted to 9,946.

The port consists of a large outer tidal harbour; three floating basins, named the old, the new, and a third basin with a reservoir of water for scouring them out; also a small tidal harbour on the western side, which serves chiefly for steam-boats and sailing vessels employed in the daily transport of passengers and the productions of the country to Le Havre. The depth in the old basin is $18\frac{1}{2}$ feet at high-water great springs, $15\frac{1}{2}$ feet at ordinary springs, and nearly 10 feet at neaps; in the new basin, $22\frac{1}{4}$ feet at great springs, $19\frac{1}{4}$ feet at ordinary springs, and $13\frac{1}{4}$ feet at neaps; and in the third basin $23\frac{1}{4}$ feet at great springs, $21\frac{1}{4}$ feet at ordinary springs, and $15\frac{1}{4}$ at neaps. Most vessels requiring to stop a tide previous to going

up the Seine, enter the port, where they are supplied with pilots or steam-tugs.

The entrance of the port is formed between two stone jetties, 230 feet apart, and is open to N. by E. The water running out of the port has cut a narrow and winding channel through a bank of shifting sand, which uncovers at low-water springs as far out as 2 cables from the end of the jetties. The direction of this channel being subject to change, is marked within 3 cables of the jetties, by three *red* and three *black* buoys, the positions of which are shifted whenever it has undergone any marked alteration. The *red* buoys are placed on the west side of the channel, and must be left to starboard, and the *black* buoys on the east side, and must be left to port in entering.

The channel outside the buoys takes a sharp turn to the eastward, which is caused by the violence of the flood stream driving the western extremity of the western edge of the beach in that direction. Vessels, however, at high-water springs, may almost always pass over the small banks which form a bar to the buoyed channel; but it would be dangerous to enter without a pilot, for the sand is so moveable and the streams, which set obliquely across the channel, so rapid, that a laden vessel grounding during a high tide would run the risk of being totally lost.

The banks at the bar are subject to change, and are almost always a foot or two above the level of the entrance channel. They vary according to the state of the banks outside, but of late years they have not undergone any sensible alteration. A new channel has been formed about 40 to 50 yards in the direction of the wooden mole which was erected in the year 1875.

The depths in the channel are 23 feet, at high-water equinoctial springs; 21 feet at ordinary springs; $17\frac{1}{2}$ at neaps.

A Life Boat is stationed at this port.

LIGHTS.—A fixed *red* light is exhibited from a white iron tower, 39 feet within the extremity of the west pier; this light is elevated 33 feet above high-water, and should be visible in clear weather from a distance of about 6 miles.

The tidal light, a *fixed* white light, varied by a series of coloured flashes indicating the depth of water in the channel, is exhibited from a brick tower at the end of the east pier. This light is elevated 39 feet above high water, and should be visible in clear weather from a distance of 9 miles. The *fixed* white light will only be exhibited when there are at least $6\frac{1}{2}$ feet water in the channel; each *red* flash will indicate 3 additional feet, and each *green* flash three-quarters of a foot more. Thus the white light varied by two *red* flashes, followed by one *green* flash, signifies that



the depth in the channel is $13\frac{1}{4}$ feet. Should the white light be varied by one *red* flash followed by three green flashes, the depth in the channel will be $11\frac{3}{4}$ feet.

From a wooden beacon erected on the extremity of the breakwater is exhibited a fixed *green* light, visible in clear weather from a distance of 3 miles.

From a circular tower erected on the hospital jetty at the north-west extremity of the town is exhibited at an elevation of 82 feet above high-water a *fixed* white light visible in clear weather from a distance of 14 miles.

Fatouville Lighthouse stands on the high lands of Fatouville, $3\frac{3}{4}$ miles S.E. by E. of Honfleur, and exhibits at an elevation of 420 feet above high water a white light, varied *every three minutes* by a *red flash* preceded and followed by a short eclipse; the light is visible in clear weather from a distance of 20 miles.

Fog Signal.—During foggy weather and snow storms, a bell is sounded from the end of the hospital jetty.

Directions.—Port Honfleur is accessible to vessels of large draught during springs; should they, however, arrive at the mouth of the Seine before these tides, it will be necessary to wait under sail (with the wind between W.S.W., round westerly, and N.N.E.) for water to enter the passages leading to Honfleur, or anchor in the Grande Rade off Le Havre if the wind be off the land; if remaining only a day or two for sufficient water, they may anchor in 5 or 6 fathoms, mud and sand, with the two lighthouses on cape de la Hève in line, bearing N.E. $\frac{1}{2}$ N., and Fatouville lighthouse seen half a point to the northward of the western lighthouse at Honfleur.

At this anchorage, named the Rade de la Carosse, the stream runs towards the Seine until 4 hours flood, and its greatest strength, which takes place at 3 hours before high water at Le Havre, does not exceed 4 knots. Vessels that have only a few hours to wait for tide, should keep under sail to the westward of the line of the two lighthouses on cape de la Hève, and a little to the northward of the line of the western lighthouse at Honfleur, in line with the lighthouse at Fatouville, bearing S.E. by E. $\frac{1}{2}$ E.; but should the strength of the tide drift them towards the river, they must anchor before passing these limits.

Passes de Honfleur.—Two narrow passages lead to port Honfleur. The northern passage lies between the Amfard and the Ratier banks, and is considered the general channel into the Seine. It is used by the pilots when the wind is between W.N.W., round north, and N.N.E.; but with contrary winds, although there is room to work, large vessels are towed by

steam-tugs. The western lighthouse at Honfleur in line with Fatouville lighthouse bearing S.E. by E. $\frac{1}{4}$ E., will lead through the passage and up to a position where a sight of the beacons at the entrance of the port may be obtained; but as a vessel must cross the banks of shifting sand, which dry at low water, and whose height is very variable, it would be extremely imprudent and dangerous to take her through if she is of great draught without a pilot, unless at nearly high water and with a smooth sea. Small coasting vessels may proceed through it at $3\frac{1}{4}$ or 4 hours flood during the springs, and half an hour before high water at the neaps.

The southern passage to Honfleur lies between the Ratier and the Trouville banks, and its direction is pointed out by the north extreme of Fonds cliff in one with La Roque point (remarkable by its grey tint and by the perpendicular steep shore at its termination), bearing E. by S. In running through, these marks must be kept on until abreast Vasoui; from thence to Honfleur keep between 2 and 3 cables from the shore. At night you may be assured that you are in this channel, when the light on point de la Roque is seen just clear of the Falaise des Fonds.

This passage is generally taken with the wind between S.S.E., round southerly, and W.N.W., and coasting vessels may run through it at $2\frac{1}{2}$ hours, and large vessels at $3\frac{1}{2}$ hours flood; but with a leading wind during the springs, it should not be entered by vessels of large draught until 4 hours flood, as that stream runs with great rapidity in the direction of the passage between Villerville and Honfleur. The flood at the springs commences 5 hours before high water at Le Havre, and runs $5\frac{1}{2}$ hours; its greatest velocity, which is towards half flood, is sometimes 7 knots between Vasoui and Honfleur. Should a vessel arrive abreast Vasoui long before high water, she should sheer a little towards the shore, where the tide has less strength and anchor until nearly high water. With strong southerly winds, precaution should be taken against the heavy gusts which rush down the narrow valleys between Penne de Pic and Honfleur, for vessels are sometimes dismasted by their violence.

Small vessels when bound to Honfleur from the south-west may use the narrow channel, noticed in page 68, between the Trouville bank and the coast; but in doing so they must proceed with caution by the lead, and give a good berth to the rocky ledge off Villerville, which has a red buoy moored off its outer extreme.

Entering Port de Honfleur.—The most favourable winds for entering this port are those between W.S.W., round westerly, and E.N.E. The extreme channel is crossed obliquely by the flood and ebb streams, and their velocity at full and change is from 5 to 6 knots. The flood continues $5\frac{1}{2}$ hours and ends at the moment of high water, and it is at this



interval of 15 or 20 minutes slack tide that a pilot will take a vessel of large draught in for there is then little difficulty in following the course of the channel.

As much sail as possible should be carried, except with a fresh fair wind, in passing through the outer part of the channel, and in all cases the anchor must be ready to let go should a sudden shift of wind or the heave of the sea force her out of the channel. In the event of such an accident a signal should immediately be made for the assistance of a steam-tug by hanging the colours under the bowsprit. If the entrance is missed, anchor immediately and await the commencement of the ebb to quit the river as speedily as possible.

When arriving off the port with a fresh southerly wind it will be necessary to guard against the sudden gusts which are felt under the hill of Notre-Dame-de-Grâce, and those which come down the valley at Honfleur. With a head-wind, or a calm, the assistance of a steam-tug should be obtained, as all the danger a vessel might incur in the river or at the entrance of the port will then be avoided. When nearing the entrance channel the tow-rope must be well shortened in, and great attention paid to follow directly in the wake of the tow-boat, for the smallest deviation in the steerage is sufficient to cause the vessel to ground upon the steep sides of the channel.

Tides and Tidal Signals.—It is high water, full and change, in port Honfleur, at 9h. 29m., springs rise 23 feet; neaps 18 feet. The bottom of the entrance channel and the deepest parts of the port are nearly on a level with the lower sill of the flood-gates of the basin, that is to say, 6 feet above the level of the lowest tides. When uninfluenced by the wind the tide rises above the lower sill, 19 feet at ordinary springs, 21 feet at the equinoxes, and 13 feet at the neaps. Westerly winds of any duration serve to raise the water, and easterly winds have a contrary effect.

During rainy weather and at the melting of the snow the freshets of the Seine are abundant, and when a strong westerly wind obstructs their course they contribute greatly to raise the water in the port. At high water the tide remains slack only 15 or 20 minutes, but the change in the height being not more than three or four inches, from half an hour before to half an hour after high water, the gates of the basin can remain open at that period without inconvenience.

The system of signals, noticed in page 8, is adopted at this port.

RIGHT BANK of the EMBOUCHURE de la SEINE.

—The extensive chalky level forming the plain of Caux, the mean height of which is about 375 feet above the level of high water, bounds the

northern shore of the estuary of the Seine. Between the meridian of Quillebœuf and the valley of Harfleur the right bank of the river is steep and presents, for a large portion of its extent, high perpendicular cliffs of chalk intersected by deep valleys, and at the entrance of the widest of them is port Harfleur.

PORT de HARFLEUR dries out every tide, and small vessels ground in it upon the slopes of mud forming the steep banks of the little river Lizarde. This river empties itself into the Seine at rather more than a mile below Harfleur, at the head of a bay, $2\frac{1}{2}$ miles wide, between Hoc point and the hill at Orcher. The lower course of the river was cleared out in 1838, and its waters formed a channel through the sands as far out as Hoc point; but in 1869 this channel was completely choked up.

Pointe du Hoc.—This low point, composed of a mass of rolled shingle, lies about $1\frac{1}{2}$ miles S.W. by S. of Harfleur, and $3\frac{1}{4}$ miles to the eastward of Le Havre. It may be recognized during the day by two large houses which were built to serve as a lazaretto, the lighthouse, and by a guard-house standing about 200 yards from the lighthouse. The point forms a considerable projection from the shore, and occasions a strong eddy during the flood. This eddy stirs up the sand and hollows out a deep the extent and depth of which are variable, but small vessels bound for Harfleur, or intending to ascend the Seine, lie aground without danger, and sheltered by the point await the spring tides. The bottom in this deep is sand and shingle, and vessels are moored securely as near as possible to either of its sides. The eddy on the flood is troublesome, and the ebb stream very rapid.

Anchorage.—Anchorage to wait the tide will be found at a cable from the shore to the south-west of Hoc point, with Harfleur church steeple seen between the two warehouses of the lazaretto; but it is not safe for vessels to go there before 3 hours flood, nor after 3 hours ebb.

LIGHT.—A *fixed* white light, dioptric and of the fourth order, is exhibited at 39 feet above high water from the lighthouse on Hoc point, and is visible in clear weather from a distance of 10 miles.

Anse de l'Heure.—Between Hoc point and Le Havre the shore and adjacent land are low, but they are defended against the invasion of the sea by a high natural bank of shingle extending to the westward as far as the middle of Heure bay, and to which an artificial embankment has been joined, abutting the wall which encloses the southern part of Le Havre. This bay seems to have been hollowed out by the violent eddy caused by the north jetty at Le Havre during the flood, and is now entirely filled up with shingle cemented together with mud, which uncovers from



9 to 13 feet at the lowest tides. In bad weather, whatever may be the direction of the wind, the waves break right on to the shore during the flood, and any vessel at that time missing the entrance of Le Havre, and driven into the bay, would be totally lost.

LE HAVRE.—The town, tidal harbour, and floating basins of this port occupy the south-west part of a low plain, which is an alluvial deposit formed at the foot of the mountain ridge bounding the communes or parishes of Ingouville and Gravelle on the north, and extending east and west from the valley near Harfleur to St. Andresse.

In 1869 the foreign and coasting trade employed 5,713 vessels measuring 1,323,286 tons, and 71,162 seamen; of this number 4,217 were French vessels, including 2,938 employed in the coasting and river trade.

The imports consist of cotton, sugar, coffee, rice, spices, hides, iron, copper, timber, tin, tea, lead, indigo, dyewoods, tobacco, &c., &c. The principal exports are silks, broadcloths, cotton goods, lace, gloves, shoes, millinery, wines, brandy, perfumery, glass, furniture, books, clocks, watches, &c., &c. The duties received at the custom-house in 1869 amounted to fourteen millions of francs. The population of the town in 1876 was 92,068.

The entrance to the tidal harbour, or Avant-port, lies S.S.E. $2\frac{1}{4}$ miles from cape de la Hève, and is open to the heavy sea which rolls in with strong westerly winds. The entrance channel is formed between two jetties, the longest of which, that on the north side, shelters the entrance from W.N.W. winds, the south jetty is short, and joins the wall which encloses La Floride basin. The harbour is accessible at high water to vessels drawing from 22 to 24 feet during five or six days at the springs; that is to say, a day or two before full and change, and three or four days after.

The harbour does not dry out at low-water springs, there being always at least 3 feet in the channel. The bank outside the south jetty is a continuation of the bank in Heure bay, and like it, is composed of shingle cemented together by mud, and forms a hard bottom, in which the anchors take hold with great difficulty. The bottom of the entrance channel is of the same description; but in the harbour the shingle is covered with a layer of mud, which forms excellent beds for vessels to ground upon.

Floating Basins.—The port of Le Havre, besides the tidal harbour, consists of ten floating basins or docks, which communicate with each other by gates. The basins are capable of receiving large merchant vessels, and are named Bassin de Roi, Bassin de la Barre, Bassin Vauban, Bassin

de la Floride, Bassin de l'Eure, Bassin Lamblardie, Bassin D'Angoulême, Bassin Saint-Jean, Bassin de la Citadelle, and dock Entrepôt; steam vessels of heavy tonnage go into the Floride and the Eure basins. The locks opening from the harbour into the Floride and Saint Jean basins are 68 feet 10 inches wide, and those leading direct from the harbour into the Eure basin are 100 feet wide. The depth of water on the sill of the Eure dock is 26 feet at springs, and 24 feet at neaps. The other locks are from 52½ feet to 37½ feet wide, which last is the lock leading into the Vauban basin, where British colliers lie.

The basins are surrounded by wide and commodious quays. The lower sills of the gates of the Roi and the Barre basins are 3½ feet above the level of the lowest springs; the sill of the gate of the Floride basin is only six inches above that level. The gates of the Roi and the Barre basins can remain open without inconvenience until the water has fallen 2 feet below high water, which both at spring and neap tides, takes place about 1½ hours after the slack of high water; and as these gates are opened by the pressure of the rising tide, about as long before the commencement of slack water, it follows that the basins can communicate with the harbour during 3½ or 4 hours of each tide.

The harbour is bordered by quays on all sides. The north quay is used by steam vessels that convey passengers on the Seine and to the neighbouring ports. The steam-tugs lie alongside the Floride quay; and all the rest of the harbour is used by vessels waiting for spring-tides to go up the Seine, and by coasting craft. In the commerce basin there are two repairing slips and a masting sheers. There is also a quay for vessels to heave down to at the upper part of the harbour, close to the gate of the Barre basin, and in 1873 considerable works were in progress for widening the entrance to the port, and increasing the dock and quay accommodation.

Life Boats.—Four life boats are stationed at Le Havre on in its immediate vicinity.

Pilots.—The pilots of Le Havre are numerous and skilful, and their remuneration is proportioned to the distance they accompany the vessel. According to regulations the greatest distance is cape Barfleur, and the shortest distance is outside the banks at the entrance of the harbour; but as there is great competition among them, they are provided with excellent boats, in which they go to meet vessels as far as the Casquets. When they pilot vessels out of the harbour, they are bound to conduct them clear of the outlying banks, and if they consent to take them farther, they are paid 15 francs, or by special agreement. Steam-tugs are in readiness to go out of the harbour every tide; and when their services are required, they are demanded by hanging an ensign under the bowsprit.



LIGHTS.—From a small tower standing on the north-west jetty of Le Havre, at about 36 feet from its termination, is exhibited a *fixed* white light, 39 feet above high water, visible in clear weather from a distance of 10 miles.

A small *fixed*, *orange* coloured light is also shown at 20 feet above high water from the end of the south-east pier visible about 5 miles. To complete the lighting of the entrance, a glass coloured *red* has been fixed to a lantern on the quay of the harbour, and this lantern is so placed that by keeping the *red* light given by it opening and shutting with the eastern edge of the Tour de François Premier, the course of the channel may be followed from its entrance nearly up to that tower.

Fog Signal.—A steam fog trumpet near the lighthouse on the north-west jetty is sounded in thick or foggy weather.

DANGERS off LE HAVRE.—The approaches to Le Havre are obstructed by banks of stones and shingle which form a belt of dangers fronting the shore between Neiges point and cape de la Hève. The highest parts of this belt are the banks named Banc de l'Eclat, Hauts de la Rade, and Haut de la Petite Rade; and in the survey of 1855 it was found that they had not experienced any sensible alteration since 1834; the summit of the Eclat is, however, a little raised.*

Banc de l'Eclat is divided into two high ridges lying a quarter of a mile apart. The depth is 6 feet on the northern ridge, but the summit of the southern ridge is awash at low water, and is one of the most dangerous spots in the neighbourhood of Le Havre. This shoal patch, which lies with the lighthouses on cape de la Hève, bearing N.E. $\frac{3}{4}$ E. $1\frac{1}{4}$ miles; and the lighthouse on the north jetty S.E. $\frac{1}{2}$ E. $2\frac{1}{4}$ miles, is stationary, and its surface is covered with masses of flint and shingle.

In the cut or depression of the Eclat bank there are only 9 or 10 feet at low water. There is a passage at the south-west end of the bank with from 9 to 15 feet in it, but it is too dangerous to be taken without a pilot.

Hauts de la Rade commence at about a quarter of a mile to the S. by E. of the Eclat, and extend as far as Neiges point. They are composed of three ridges separated from each other by narrow channels with from 10 to 12 feet water in them. The north-west ridge is about 6 cables long and a cable broad, and has only 3 feet water on its highest part, which lies S. by E. $\frac{1}{4}$ E. 7 cables from the highest part of the Eclat.

The western ridge lies half a mile to the southward of this dangerous spot, and has only 5 feet on its western end; it is the outermost danger on the parallel of the entrance to Le Havre, and is marked by No. 5 buoy,

* See Admiralty chart :—Entrance of the Seine, No. 2,680; scale, m=2 inches.

by w. $\frac{1}{4}$ W. half a mile from the north jetty, with
is marked by a buoy.

Buoys.*—A whistle buoy, painted black and red
in 7 fathoms water, W. $\frac{1}{2}$ N. $3\frac{1}{2}$ miles from the south
Hève. The whistle should be heard under favourable
and sea from a distance of 5 miles. It will be seen from
of the entrance of the Seine, that the western side
and Les Hauts de la Rade are marked by buoys numbe
1 (Bell buoy) to 5, the latter being moored in $4\frac{3}{4}$ f
lighthouses on cape de la Hève in line. Each buoy
nized by its distinguishing ball, triangle, &c., but un
should a stranger pass within the line of these buoys
whose services are almost always obtainable.

PETITE RADE du HAVRE lies in the
the banks just described, and the coast between Le Havre
Hève. It is well sheltered from N.E., round Easterly
to all other winds; and those between North and W.S.
sea when blowing strong. The holding ground is good
take such firm hold of the clay that there is some
in weighing, especially when vessels lying here have
strong westerly winds. It should, however, only be used as
temporary anchorage, to which vessels may resort
to wait for sufficient water to enter the harbour, but
to remain there in unsettled weather, or when it blows
westward.

Vessels of moderate draught anchor in the middle of
16 to 25 feet water.



and the depth too little in to risk large vessels stopping there any length of time.

Small vessels are placed nearer the shore on the line of Fatouville lighthouse open a little to the northward of the light-tower on the jetty, but no nearer the shore than to have the southern lighthouse on the cape bearing North. The holding ground is so good here that a small vessel well moored, and with a sufficient scope of cable out, would be in no danger during a westerly gale, without she parted.

Directions.—The only practicable entrance channel into the Petite rade du Havre, that can be made use of by vessels of moderate draught at low water, is between the cliffs of cape de la Hève and the northern ridge of the Eclat, but a stranger should not use it without a pilot. The least depth in it is from 12 to 15 feet at low water, midway between the northern ridge and the shore.

To enter this channel steer for the southern lighthouse on the cape on a S.E. $\frac{1}{2}$ E. bearing, and it will lead nearly 3 cables north of No. 1 buoy placed near the northern ridge of the Eclat; when about 3 cables from the cliffs the vessel will be in mid-channel, and must then bear away to the southward for the red buoy No. 8 moored between the northern ridge and the shore, taking care not to approach so near the land as to entirely lose sight of the lantern of the northern lighthouse. Small vessels, locally acquainted, may run for the anchorage in Petite rade at low water, passing through the channel, either northward or southward of the southern ridge of the Eclat; but the lead and chart must be their guide.

GRAND RADE du HAVRE lies about N.W. by W. 5 miles from cape de la Hève, and is simply an anchorage in the open sea, exposed to the violence of both winds and waves from N.E., round northerly, to W.S.W. Vessels of large draught, having to wait for the springs to enter Le Havre, may sometimes anchor in it when the wind is between E.N.E., round easterly, and S.S.W., but they should be prepared to weigh instantly, upon any change in the weather. The holding ground is excellent, and a vessel at anchor in the centre of the road, in 9 fathoms water, will have cape de la Hève bearing S.E. by E., and Fatouville lighthouse in line with the light-tower on the north jetty at Le Havre, S.E.

When bound into the harbour of Le Havre from the Grande Rade, weigh, if the wind be between E.N.E. round easterly, and S.W., as soon as the flood has acquired strength, so as to be near the Hauts de la Rade before the stream changes its direction to the N.E. When near these banks, the directions must be attended to for entering the harbour given in page 86. With a fair wind, weigh so as to be at the harbour's mouth at the proper time for entering.

Tides.—The flood stream begins in the Petite Rade at about $1\frac{1}{2}$ hours after the tide has begun to rise in the harbour, or at about 4 hours before high water there. Its first direction is S. by E. for 2 hours, with a velocity of $2\frac{1}{2}$ to 3 knots; it then turns to the E.S.E. and the stream is imperceptible until high water in the harbour, when it again acquires its strength and runs to the N.N.W. and ends in that direction $1\frac{1}{2}$ hours after. The ebb commences immediately and runs N.N.W. for 3 hours or until $4\frac{1}{2}$ hours after high water in the harbour; it then turns to the W.S.W. and ends in a S.W. direction a few minutes before the flood commences.

At the northern entrance into the road the stream follow the same course, but the flood does not end until 2 hours after high water. The ebb runs to the N.N.W. during $2\frac{1}{4}$ or 3 hours, and then turns W.S.W. and S.S.W. When the tide is out in the harbour the ebb runs S.S.W. at the rate of $1\frac{1}{2}$ to 2 knots, and it ends in this direction a little before the flood stream commences at this spot, or about 4 hours before high water in the harbour. Vessels running into this road at low water should be aware of this stream of tide when passing the shoal patches.

The flood stream begins to be felt in the Grande Rade at about 4 hours before the time of high water at Le Havre. An hour after, it runs to the S. by W. at the rate of about 3 knots, and continues to run towards the Seine until $2\frac{1}{2}$ hours before high water; its direction is then E.S.E., losing little of its strength, and then E.N.E. In the latter direction its rate increases to $2\frac{1}{2}$ or 3 knots at the time it is high water in the harbour; it then decreases in strength, and the stream ends about 2 hours after, running to the N.E. by N.

The ebb commences almost as soon as the flood ends, the slack water lasting only about a quarter of an hour at the springs. This stream turns round by the west, and about 3 hours after high water its direction is N.W., but it does not attain its greatest strength, which is $2\frac{1}{2}$ knots, until it runs W.S.W., or about 5 hours after high water; it then slackens gradually as it turns to the southward, where it ends.

Directions from the Westward.—Generally speaking it is the direction of the wind which is met with at the entrance of the Channel that should determine the choice of the mariner, as to the landfall he should make in order to take a fresh departure for the remainder of the voyage to Le Havre. With the wind between E.N.E., round northerly, and W.S.W., the English coast should be made between the Lizard and Portland Bill, but not to the eastward of the Bill, for, should it veer to the S.W. it would then be impossible for a sailing vessel to reach Le Havre if the flood stream were running. As soon as the position of the vessel is



well ascertained a direct course should be shaped to sight the lighthouse on cape Barfleur.

With the wind between W.S.W., round southerly, and S.S.E., the points of the French coast which should be sought for in succession are, the isle of Ouessant ; the high land between that island and Bas isle ; the island of Guernsey, the sight of which will assist in making the Casquets ; and lastly, the island of Alderney, and the high land crowning cape de la Hague. Great attention, however, must be paid to the tidal streams when running between Bas isle and Guernsey, the directions of which must be crossed nearly at right angles. During the ebb there is no danger, as it runs towards the N.N.W., but on the flood it will be necessary to allow for the effect of that stream, which is rapid at the springs. At 10 miles from the coast, between Ouessant and Bas isle, the flood stream ends at about $2\frac{1}{2}$ hours after high water on the shore.

In the channel between Guernsey and the Casquets the rate of the flood is from 4 to 5 knots at springs ; its influence must therefore be avoided, and a vessel should at all times manage to pass to the westward of the Casquets, and, if possible, only just within sight of them. In the channel between Alderney and cape de la Hague, as well as 5 miles to the northward of that cape, the flood stream ends at 4 hours after high water on the shore, and its greatest speed, which is from 6 to 7 knots, takes place at the time of high water.

The ebb stream ends $3\frac{1}{2}$ hours flood on the shore, and its greatest rate which takes place at low water, is about equal to that of the flood. As the direction of this latter stream is towards the W.S.W., and tends to draw vessels into the Race of Alderney, as well as between Alderney and the Casquets, it will be necessary to be extremely attentive to its effects according to the hour of the tide and the distance the vessel may be from the shore. From the meridian of cape de la Hague the course will be about E.S.E. to make the lighthouse on cape Barfleur taking care to keep from 3 to 6 miles from the coast in order to avoid the numerous dangers which border it.

When the lighthouse at cape Barfleur or the high land at La Pernelle are made out, a course should be shaped, if the wind is between North and West, to make the land between cape de la Hève and cape Antifer, or if it is between West and South, for the former cape. After passing cape Barfleur, and having entered the bay of the Seine, the first land that will be seen when steering for Le Havre, is that which bounds the estuary of the Seine on either side. The high land of the plain of Caux will be ahead and to the northward, terminating towards the coast in chalky cliffs of dazzling whiteness, which, when lighted up by the sun, permit their outline to be distinguished from 18 to 20 miles off; and the land to

the southward will be the hills bordering the left bank of the Seine from Honfleur to the river Dives, and their rounded shape, and especially their dark colour, will serve to distinguish them from those to the northward.

When the meridian of cape Barfleur is crossed towards the commencement of the flood, that is, about $5\frac{1}{2}$ or 6 hours before high water at Le Havre (see table, page 36), a vessel with a leading wind may arrive off Le Havre in time to get into the harbour should the tide serve. On quitting the meridian of Barfleur at the commencement of the ebb, or about one hour after high water at Le Havre, a course should be shaped for cape Antifer, and only sufficient sail carried to stem the tide which will be found running, in the middle of the bay, $3\frac{1}{2}$ or 4 knots at springs, at about $4\frac{1}{2}$ hours after high water at Le Havre. Should the position of Le Havre be made out before the commencement of the flood, it may be taken advantage of as soon as its influence is felt; but the sail must be regulated so as not to arrive off the harbour's mouth until there is sufficient water to run in with.

At night, with the wind between North and West, a course should be shaped from cape Barfleur to make the land between cape de la Hève and cape Antifer. The lights on cape de la Hève and the light at Fécamp will be good guides to point out the vessel's position, and to prevent her approaching too near the land, if it is borne in mind that Fécamp light is concealed by the high land at Etretat on an E. $\frac{3}{4}$ N. bearing and the lights on cape de la Hève by the Hillocks at Bléville when they are in a S.W. by S. direction; so that if Fécamp light is concealed before those on the cape, the land will be made to the southward of cape Antifer, and if the lights on the cape are hidden before the light at Fécamp, it will be necessary to haul quickly to the southward.

The light at Fécamp will not be lost sight of at the distance of 6 or 7 cables off cape Antifer, nor the lights on the cape when at the same distance off the coast between cape Antifer and Cauville. Thus, should it be desirous of maintaining a position during the night by turning to windward between cape Antifer and Cauville, go about, when standing in for the land, as soon as the lights on the cape disappear, and in standing off shore during the flood, tack when Fécamp light reappears; but during the ebb the board may be continued farther without inconvenience.

With a moderate breeze and a smooth sea a vessel may anchor on the line of direction where Fécamp light is eclipsed by the land, provided she is some miles to the southward of the parallel of cape Antifer. The holding ground is excellent as far as 5 miles off shore between that cape and the Grande rade, but near the coast between the guard-house of Bléville and Cauville the bottom is covered with heaps of large stones to



the distance of $1\frac{1}{2}$ miles from the shore. It may be proper here to remark, that between capes la Hève and Antifer the flood stream runs to the N.E., at 4 or 5 miles from the shore, for 4 hours; that is, from 2 hours before to 2 hours after high water at Le Havre, at the rate of 2 or 3 knots at springs, and when it slackens it turns to the northward, so that a vessel caught by a contrary wind when south of cape Antifer, would be unable during that period to reach Le Havre by turning to windward close in shore, but she may reach the Grande rade by keeping at least 4 miles from the coast. During the freshes of the Seine it is necessary to avoid getting to the northward of the parallel of cape de la Hève when intending to enter Le Havre.

When rounding cape Barfleur with a southerly wind, from a position about 6 miles to the northward of the cape, steer S.E. by S. or S.E. to sight Ver lighthouse, and when on the meridian of the lighthouse keep away two or three points to sight the lighthouses on cape de la Hève. Le Havre should then be steered for if the tides serve, but the sail must be regulated so as not to arrive off the harbour's mouth until there is sufficient water to enter; if not, steer for the anchorage in the Grande rade. With a head wind, long boards should be made across the bay of the Seine by day as well as by night, recollecting that the flood stream ends in the bay nearly $2\frac{1}{2}$ hours before high water at Le Havre.

From the Eastward, with the wind between North and East, the channel between the Ridge bank or Le Colbart and the French coast should be taken, and thence a S.W. by W. course will lead between the Bassurelle and Vergoyer banks, direct for cape Antifer; Fécamp light will be seen in following this course, and will be a good guide at night. This channel is also used in fine weather when the wind is between South and East keeping 4 or 5 miles from cape Griz-Nez, and passing outside the Bassure de Baas bank. When to the southward of the river Somme, and to the westward of the meridian of Dieppe, the coast may be neared if necessary; but should the wind veer to the south-west a vessel should quit it immediately, and if it increases to a gale, a sheltered anchorage will be found to the eastward of Dungeness.

With the wind between N.N.W., round westerly, and W.S.W., the channel should be used between the Varne bank and the English coast. From Beachy head to cape de la Hève the course is S.S.W. $\frac{1}{4}$ W. and the distance 74 miles. As the passage across with westerley winds is made more advantageously on the ebb than on the flood, vessels therefore usually wait in sight of Beachy head lighthouse for the end of the flood, so as to arrive abreast of cape Antifer at the beginning of the following flood, in time to enter the harbour of Le Havre if the tides serve. Fécamp light is

an excellent guide for the landfall on the coast of France, and will be seen in clear weather soon after that at Beachy head is lost sight of.

Directions for entering Le Havre.—Vessels arriving off this port some hours before the tide serves to enter, should remain outside the banks off the entrance, until the tide has risen sufficiently to pass over them, but a stranger should not attempt to enter without a pilot. The stream runs into the Seine from the commencement of the flood until 2 hours before high water; but there is no fear of their being drawn into the river if they keep to the westward of the line of the two lighthouses on cape de la Hève, bearing N.E. $\frac{1}{2}$ N., or if cape Antifer is kept open a few degrees to the westward of cape de la Hève, taking care at the same time not to go to the southward of the line on which the château d'Orcher, which stands near the shore at about 2 miles to the eastward of Harfleur is seen in one with the projecting angle of the wall enclosing La Floride, bearing E. $\frac{3}{4}$ S.

With a fresh breeze between W.N.W., round northerly, and E.S.E., there will be no difficulty in turning to windward and keeping a position; but with all other winds keep as near the line given by the château and the wall at La Floride in one, because at about 2 hours before high water in the harbour, when the Seine is nearly filled, the flood stream turns to the E.S.E., losing part of its strength, and then to the N.E. In the latter direction it runs with the same velocity as when it ran up the Seine, and retains it until nearly $2\frac{1}{2}$ hours after high water, and should a sailing vessel at that time be near the parallel of cape de la Hève, it would be almost impossible for her to reach the harbour in proper time to get in.

With strong winds between N.N.W., round westerly, and W.S.W., it will be necessary to keep under sail 6 or 8 miles to windward of the harbour until there is sufficient tide to enter; but with moderate winds between S.W., round southerly, and E.N.E., or during calm weather, or at the times of the freshes of the Seine, it will be better to anchor in Carosse road (page 73), or between that road and the line upon which the château d'Orcher, is seen in one with the projecting angle of the wall enclosing La Floride, E. $\frac{3}{4}$ S.

Vessels can always get into the harbour from the anchorage in the Petite rade, even during calms or head winds. Those of large draught which have failed in entering, and when the direction of the wind and the late hour of the tide do not permit of a second attempt, should hasten to run out of the Siene; but small vessels may take shelter under Hoc point (page 76), whilst the tide is high.

The direction of the entrance channel into the harbour of Le Havre being at right angles to the direction of the flood stream entering the Seine, it consequently crosses the mouth of the harbour, and renders its



access difficult under certain circumstances, which are necessary to be known.

The north jetty projects into the strength of the flood stream, and occasions an eddy, the strength and extent of which depend upon the velocity of that stream and upon the range of the tide. At about 3 hours before high water, when the stream begins to acquire its greatest strength, which is 4 or 5 knots at the springs, the eddy extends as far as Heure bay, and forms along the shores of that bay, and also along the walls enclosing La Floride, a rapid counter stream, a part of which turns round the end of the south jetty to enter the harbour, whilst the other part runs sharply against the north jetty, along which it forms a disturbed eddy.

This motion of the water continues till about $1\frac{1}{2}$ hours before high tide in the harbour; but at this period the Seine, being nearly full, can no longer receive all the water which runs towards it from all points of the estuary, the stream therefore slackens, except towards the left bank of the river, where the flood, following nearly the same direction that it would do supposing the Seine did not exist or was entirely barred off, not finding any issue upwards, crosses the Seine obliquely, and runs to the north-east; this direction, however, soon changes and becomes more northerly as the river fills.

As soon as this cross stream has gone through these changes and reached Hoc point, a portion of it runs along the shore to the westward and produces the stream named the Verhaule, which at the entrance of Le Havre follows the same direction as the eddy on the flood, just noticed, and immediately follows it, but always with this difference, that the Verhaule passes round the jetty and runs to the north-west. It is easy therefore to imagine that the confusion caused by these different effects of the flood stream, must raise a high and violent sea at the entrance of the harbour when it blows strong from the westward.

The Verhaule, a part of which enters the harbour and tends to fill it, is evidently the last portion of the flood; but as it runs in an opposite direction to that which the flood follows during the first hours of rising tide, it keeps vessels in the entrance channel, and facilitates their entrance with westerly winds. Its greatest strength is about three-quarters of an hour before high water, and continues until the harbour is filled, when it decreases gradually, and is hardly perceptible at the end of slack water. The ebb then commences, and is feeble at first, but at the expiration of an hour it gains strength and runs towards the North and N.N.W. in the same direction as the Verhaule when near its end.

The deviation of the flood stream, occasioned by each of the projecting angles of the quays bordering the entrance, is another difficulty in entering Le Havre with a scant wind, especially if a vessel has entered before the basins and the harbour are filled.

From what has preceded, it will be seen that the best time to enter the port of Le Havre, for those vessels that purpose remaining in the outer harbour, is at high-water slack, but this is rather too late for those intending to enter the basins. These, on the contrary, should enter as soon as the tides serves, to have time to be well secured before the beginning of the ebb. The anchors should be ready for letting go before entering, and one place conveniently for anchoring by the stern; the warps also and the hawsers must be coiled clear on deck, ready to be carried out in case the vessel is obliged to anchor in the entrance channel.

The time of tide, however, to be chosen by a sailing vessel for entering must greatly depend upon the direction of the wind. With a fresh westerly wind she may run in even whilst the counter stream which runs along the walls of La Floride is at its greatest strength, but care must be taken to keep in mid-channel, so as not to drift on the north jetty.

With fresh winds between W.S.W., round westerly, and N.N.W., the Verhaule causes a violent sea, and it will be better then to wait till the end of slack water to enter, for the sea is then rather less confused, and the tide is slack in the entrance channel. This precaution is especially necessary when the vessel does not answer her helm quickly.

With the wind sufficient strong between S.S.W., round southerly, and E.S.E., to stem the tide, she may enter before the Verhaule commences and steer on the starboard tack for the north jetty, to get hold of the hawser which the hauling crew will throw out to her, and she will then be tracked into the harbour. Should the wind, however, be between E.S.E., round easterly, and N.E., it will be advisable to wait until the Verhaule slacks, in order to steer for the north jetty on the port tack, when by luffing up she will reach the hawser. The sails should then be furled, and the vessel will be tracked in. Pilots with their boats are always ready at the entrance to carry the hawser on board, and to run out warps when necessary, except when the sea is too high and violent to prevent them. Steam-tugs are also in readiness during calms and variable winds.

Tides and Tidal Signals.—It is high water, full and change, in Le Havre harbour at 9h. 18m. The water let out of the basins and that which escapes from the sluices at the locks serve to keep a channel through the mud of the outer harbour, which never has less than a depth of 3 feet at low water springs. The rise of tide in this channel is 22 feet at ordinary springs, 24 to 25 feet at the equinoxes, and 18 feet at neaps.

When the tides are forced up by high winds from the westward the water rises upon the quays, but this seldom occurs. The direction of the wind, and more especially its force and duration, exercise a great

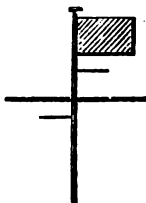


influence on the height of the tide. The freshes of the Seine, which occur during the rainy season, and the melting of the snow, also contribute greatly to raise the water in the harbour, and it has been remarked that the highest tide have almost always occurred during the strongest freshes.

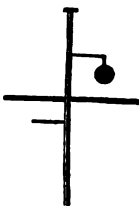
This harbour has this advantage over almost all the other harbours of the channel, that the tide at high water remains slack in it during the mean interval of 57 minutes. The maximum duration has been observed to be 1h. 15m., and the minimum from 20 to 25 minutes. This long period of nearly slack water is very valuable to the traffic of the port, and allows several vessels to enter or leave the docks on the same tide. In general, during the months, of May, June, and July, the duration of the slack water is, with some exceptions, below the mean, and the rest of the year it continues almost always an hour or more. At the springs the duration of the flood is 5h. 10m., and of the ebb 7h. 15m.

The system of tidal signals (noticed in page 3) is used at Le Havre. The depths of water in the entrance channel are made from the Tour de François Premier at the entrance of the harbour, and thence repeated from the telegraph station on cape de la Hève.

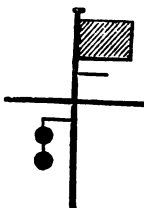
To prevent accidents to vessels entering the harbour, the following additional signals are made at the flag staff on the north jetty :—



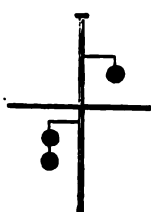
A blue flag on top of mast { The basins are full and open.



A ball above the yard } Cannot enter the port.
pointing towards the road.

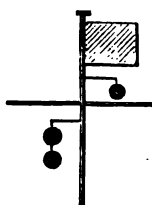


A blue flag on top of mast { No vessels allowed to go
and two balls under the } out, and all movements
yard pointing towards } forbidden in the avant-
the port. port.



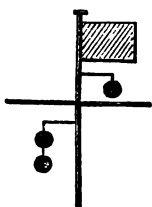
A ball above the yard pointing towards the road, and two balls under the yard pointing towards the port.

No vessels allowed to enter or go out, and all movements forbidden in the avant-port.



Two balls under the yard pointing towards the port, and one ball above the yard pointing towards the road. A blue flag at top of mast.

All movements stopped in the port to facilitate the entrance of large vessels of war and the Transatlantic steamers.



Two balls under the yard pointing towards the port, and one ball above the yard pointing towards the road. A green flag at top of mast.

All movements stopped in the port, to facilitate the departure of large vessels of war and the Transatlantic steamers.

At night the blue flag is replaced by a white light, the green flag by a green light, and the balls by red lights.

CAPE DE LA HÈVE, formerly known by the name of Chef de Caux, lies about 2 miles to the N.N.W. of Le Havre, and forms the south-western point of the chalky cliffs which terminate the plain of Caux. The cape is perpendicular about halfway down from its summit, the foot of the cliff being covered with the débris of frequent slips and fallen masses.

From cape de la Hève the coast trends N.E. $\frac{1}{2}$ N., nearly in a straight line for rather more than 11 miles to cape Antifer, and is composed of cliffs of chalk and flint, the height of which is from 320 to 370 feet, and with on shore winds offers no accessible spot. Between cape de la Hève and the little valley of St. Jouin the crown only of the cliffs are perpendicular, the lower parts being banked up by enormous masses of flint which have mouldered down. It is said that the percussion of the large waves raised by the frequent winds between North and West forces these masses continually along the shore, and that they have formed the banks which obstruct the approach to Le Havre and the Seine. Beyond the valley the cliffs are quite perpendicular, the sea washing their bases, and in the afternoon, when they are lighted up by the sun, their brightness is so dazzling that they may be seen 21 miles distant.



LIGHTS.—On the summit of cape de la Hève stand two lighthouses, each 66 feet high, from which are exhibited two *fixed white electric* lights of the first order, elevated 397 feet above the water, and visible in clear weather from a distance of 27 miles.

The lighthouses are square, white buildings bearing N.E. $\frac{1}{2}$ N. and S.W. $\frac{1}{2}$ S. distant 106 yards from each other; the southern lighthouse stands 100 yards from the edge of the cliff. The intensity of the lights will be doubled in thick fogs. The lead should be frequently used when approaching these lights from the westward, especially if Ver light has not been sighted.

Tidal Streams in the Bay of the Seine.—The tidal wave of flood after having traversed the western portion of the Channel, is much contracted as it advances to the eastward, between Cherbourg and the Isle of Wight, and in consequence of this compression its velocity is greatly increased, particularly towards the French coast. As soon as it has passed the meridian of cape Barfleur, its southern portion turns rapidly in every direction between South and East, to fill up the empty space occupied by the bay of the Seine; whilst the eastern portion, or that part to the northward of a line drawn from cape Barfleur to cape Antifer, follows its original direction almost as far as the meridian of the river Orne, where it begins to curve to the East, and E. by N.

A considerable portion of the water which enters the bay, after rounding cape Barfleur with great rapidity, forms a stream which takes a S.E. by S. direction towards the mouth of the Seine. The southern part of this stream runs along the shore of the bay, and follows its sinuosities from Percée point to the mouth of the Orne, and then turns towards the Seine; the northern part turns obliquely towards the coast between Le Havre and cape Antifer, and then bends back to the S.S.W. and S.S.E. towards the Seine. Thus the mouth of the Seine being the point towards which all these streams are directed, the river becomes full at two-thirds flood, and the water within having attained the level of that without, the streams lose their strength and are forced to the eastward, and run towards the E.N.E. and N.E. in the direction they would have naturally followed from the commencement of the tide, if the Seine had not existed, or had been completely barred up.

The ebb stream, in general, when at its greatest strength, follows in the interior of the bay an opposite course to that of the flood; but to the northward of the line drawn from cape Barfleur to cape Antifer its direction is W. by N., whilst that of the flood is E. by N. and E.N.E. The windings of the coast modify the direction of both streams near the shore, and behind each of the projecting points there is an eddy which depends on the strength of the tide for its extent.

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TABLE showing the Direction and Rate of the Tidal Streams, during Ordinary Springs, from Cape Barfleur to Cape Antifer.

Positions.	Tidal Stream.	Time with reference to High Water at Le Havre.	Direction.	Rate.	Duration.
		h. m.		Knots.	h. m.
E. by S. $\frac{1}{2}$ S., 11 $\frac{1}{2}$ miles from Cape Barfleur.	Flood - - -	2 45 before	S.E. by S. -	4'8	1 30
	End of flood - -	0 45 after	-	-	-
	Ebb - - -	3 40 "	N.W. by N. -	4'3	2 0
	End of ebb - -	5 20 before	-	-	-
N.E. by E. $\frac{1}{2}$ E., 43 miles from Cape Barfleur.	Flood - - -	1 50 before	E. by S. $\frac{1}{2}$ S. -	3'5	0 45
	End of flood - -	1 30 after	-	-	-
	Ebb - - -	5 10 "	W. by N. -	3'3	0 45
	End of ebb - -	4 40 before	-	-	-
E.S.E., 10 miles from Port de Barfleur.	Flood - - -	3 0 before	S.S.E. -	4'4	1 30
	End of flood - -	0 25 after	-	-	-
	Ebb - - -	3 25 "	N.N.W. -	4'2	2 0
	End of ebb - -	5 15 before	-	-	-
E.S.E., 8 miles from St. Marcouf islands.	Flood - - -	2 20 before	S.S.E. -	3'5	4'45
	End of flood - -	0 30 after	-	-	-
	Ebb - - -	4 0 "	N.N.W. -	3'0	1 0
	End of ebb - -	5 5 before	-	-	-
N. by W., 8 miles from Ver lighthouse.	Flood - - -	5 15 before	S.E. $\frac{1}{2}$ S. -	3'5	2 30
	End of flood - -	0 50 after	-	-	-
	Ebb - - -	4 0 "	N.W. by W. -	3'2	-
	End of ebb - -	4 50 before	-	-	-
N.E. by E., 7 miles from Ver lighthouse.	Flood - - -	2 30 before	East - -	3'0	-
	End of flood - -	0 55 after	-	-	-
	Ebb - - -	4 30 "	N.W. - -	2'8	-
	End of ebb - -	4 45 before	-	-	-
N.N.E. $\frac{1}{2}$ E., 11 miles from the entrance of the river Orne.	Flood - - -	2 40 before	S.E. - -	3'5	-
	" - - -	2 0 "	E.S.E. - -	3'0	-
	" - - -	1 30 "	E. by N. -	3'5	-
	End of flood - -	1 0 after	-	-	-
At the entrance of the southern channel to Honfleur.	Ebb - - -	4 30 "	N.W. - -	3'0	-
	End of ebb - -	4 45 before	-	-	-
	Flood - - -	3 30 before	E. by N. -	4'0	-
	" - - -	1 30 "	N.E. by E. -	1'0	-
In the southern channel to Honfleur, between Vasoui and the Falaise des Fonds.	End of flood - -	0 50 after	-	-	-
	Ebb - - -	3 30 "	West - -	3'8	-
	End of ebb - -	5 0 before	-	-	-
	Flood - - -	3 0 before	East - -	7'5	4 0
N.W., 18 miles from Cape de la Heve.	End of flood - -	At high water	-	-	-
	Ebb - - -	1 0 after	N.W. - -	3'0	-
	" - - -	5 0 "	W. by N. -	6'5	-
	End of ebb - -	5 20 before	-	-	-
N. by E., 6 miles from Cape de la Heve.	Flood - - -	2 25 before	E. by S. -	3'5	1 30
	End of flood - -	1 25 after	N.E. - -	0'3	-
	Ebb - - -	4 30 "	N.W. by W. -	3'3	1'30
	End of ebb - -	4 30 before	N.N.W. -	0'2	-
N. by E., 6 miles from Cape de la Heve.	Beginning of flood	3 45 before	S.S.W. -	0'6	-
	Flood - - -	3 30 "	S.E. by S. -	0'4	-
	" - - -	3 0 "	East - -	1'4	-
	" - - -	2 0 after	N.E. by N. -	2'2	-
N.N.W., 15 miles from Cape Antifer.	End of flood - -	2 30 "	N.N.W. -	-	-
	Ebb - - -	5 0 "	W.S.W. -	1'8	-
	End of ebb - -	4 0 before	-	-	-
	Flood - - -	1 30 before	East - -	4'0	-
N.N.W., 15 miles from Cape Antifer.	End of flood - -	2 0 after	-	-	-
	Ebb - - -	5 0 "	W. by N. -	3'5	-
	End of ebb - -	4 0 before	-	-	-
	Flood - - -	1 30 before	-	-	-

CHAPTER III.

CAPE D'ANTIFER TO CAPE GRIS-NEZ.

VARIATION IN 1882.

Fécamp - - - -	17° 50' W.
Entrance of River Somme	17° 40' W.

ASPECT of COAST.—Cape Gris-Nez bears N.E. by E. from cape Antifer, distant 89 miles, the coast between forming a considerable bight to the south-east, 106 miles in circuit, and 24 miles deep. The high cliffs of chalk and flint extend from cape de la Hève to about 4 miles to the north-east of Tréport, near the town of Ault, and beyond them commences a low coast fronted by a sandy beach upon which three wide valleys open out and give issue to the waters of the rivers Somme, Authie, and Canche. This low coast extends to within about 4 miles of Boulogne; the land then rises abruptly, and the shore continues steep, with a few exceptions, as far as cape Gris-Nez. All the harbours between capes Antifer and Gris-Nez dry at spring tides, and are inaccessible to vessels of large draught during neaps.*

The cliffs between cape Antifer and Ault are precipitous, their foot resting upon a narrow shelf of rock covered at all times of tide. The ports of Fécamp, St. Valéry-en-Caux, Dieppe, and Tréport, lying at about equal distances from each other, are situated at the entrances of wide valleys, which form breaks in the line of cliffs. The land crowning the cliffs is for the most part level in its whole extent, but the monotonous aspect of the coast is varied by the towns and villages near the sea, and by the verdure covering the sides and the bottom of the valleys, which contrasts with the uniform white colour of the cliffs. As the openings of all the valleys are dissimilar in some points, it will be easy to recognise them from each other, even from a considerable distance in the offing.

The cliffs remarkable for their elevation are, that of Fagnet point, the north point of entrance to the valley of Fécamp, upon which stands a chapel dedicated to Notre-Dame-du-Salut and Fécamp lighthouse; the cliff of Catellier, with a small mound on its summit, which forms the western

* See Admiralty charts:—North coast of France, sheet XII., Trouville to Dieppe, No. 2,612; scale $m = 0.5$ of an inch; and Dieppe to Boulogne, No. 2,611; scale $m = 0.5$ of an inch.



side of a wide valley, named Pallud, watered by the Durdent river; the cliff of St. Léger, at three-quarters of a mile to the westward of St. Vallery-en-Caux, marked by a church tower, the only remaining part of the church; the cliff of Sotterville, rendered remarkable by a large guard-house and a heavy-looking church tower, overtopping a row of trees; and the cliff at Criel, at $3\frac{1}{2}$ miles to the south-west of Tréport, which is the highest of them all, and is surmounted by a large hillock covered with heath, called Mont Joli-Bois. When sailing close to the coast with off-shore winds, precaution must be taken against the squalls which rush down the valleys; the most violent are felt abreast the openings that do not reach to the beach.

The entrances of the rivers Somme, Authie, and Canche are formed in the low land which extends over a space of 35 miles, from half a mile to the north-east of Ault to the foot of the hills, the most western parts of which form cape Alprech, but they are now all obstructed by banks of shifting sand, which project far outside their openings and dry at low water springs. The small harbours of Vimereux and of Ambleteuse have been abandoned and can no longer admit any vessel.

The coast between cape Antifer and Ailly point, about 5 miles to the westward of Dieppe, is without danger, and large vessels may coast it at the distance of $1\frac{1}{2}$ miles; but to the eastward of this point the approach to the shore is dangerous for vessels of large draught, for from the meridian of Ailly point to that of Tréport are banks of sand and shells, usually called Ridens, extending 11 miles from the shore; and to the eastward of these is the shoal bottom which forms the basis of the banks of shifting sand obstructing the mouth of the Somme, and which extends even to the northward of the river Canche.

Outside these dangers, and towards the middle of the Channel, are several long submarine banks of sand, seeming to converge in a direction towards cape Gris-Nez. These banks lie generally E.N.E. and W.S.W., nearly in the direction of the tidal streams; but the Ridens or ridges, point to the N.N.W. and S.S.E., in a direction perpendicular to the banks, and consequently across the streams.

There are spots with only 2 and 3 fathoms over them on several of these banks, they are therefore very dangerous for large vessels at all times of tide, while some are only so at low water: but at full and change the tidal streams form strong eddies at their steep edges, and in bad weather, or when the winds blow strong on a weather tide, small vessels crossing these eddies will subject themselves to a heavy sea. The greater part of the ridges are only to be avoided from the eddies they occasion, but shoal spots have been found on some of them, which at low water in bad weather, might be dangerous to vessels of large draught.

CAUTION.—During strong winds between W.S.W., round westerly, and N.N.W. the coast to the eastward of Ailly point is dangerous to be on, and shipwrecks are of frequent occurrence; vessels therefore of every description at that period should keep a good offing, and when obliged to approach it must do so with great caution; for although the general mass of the above bank appears to be stationary, yet great attention must be paid to the lead and observing the confused state of the sea in the various eddies, so as to guard against suddenly meeting with dangers which may be of recent formation. The lights for the purpose of pointing out the position of the headlands and dangers between capes Antifer and Gris-Nez at night, are so disposed that in clear weather two can always be seen at a time, and the greater number of the harbours have one or more tide lights shown during the time the harbour can be entered.

It is important to notice that along the coast between cape de la Hève and the town of Ault (a space of 67 miles) the wind, when it blows in a direction perpendicular or nearly so to the direction of the coast, is reflected by the high cliffs, neutralising in great measure its original action to a certain extent in the offing, depending upon the strength of the wind. It follows from this that a zone is formed off the coast and parallel to it, except in front of the wide valleys where the direct wind meets with no obstacle, where the wind is light, the sea much agitated, and the waves run towards the shore. On the contrary, when the wind forms an acute angle with the coast, the reflected wind contributes to increase the direct wind near the shore.

CAPE D'ANTIFER differs little from the adjacent land, and is only remarkable for the change in the direction of the coast. The cape is rounded, and terminates in a perpendicular chalk cliff, 320 feet high, the foot of which is washed by the sea, and in clear weather it may be seen 18 or 20 miles distant. Vessels of any draught may approach it to 2 or 3 cables without danger even at low water; and hence the coast trends about E. $\frac{3}{4}$ N. 9 miles to Fécamp, and the shore may be approached to 4 cables.

ÉTRETAT, a large fishing village and fashionable watering place, stands upon the shore at the entrance of a wide valley open to the north-west, and the houses are built upon low land defended from the incursions of the sea by a natural dyke of shingle, upon which the fishermen heave their boats out of the reach of the surf with capstans; an embankment 44 yards long serves to strengthen this dyke and to protect it in bad weather from the force of the waves.

The cliffs both to the eastward and westward of Étretat are very remarkable. They form sharp projecting points with openings in them resembling



arches and doorways. At half a cable south-west of the point, to the westward of the village, is a high rock, or rather the remains of the fallen cliff, to which, from its pyramidal form, the name of *Aiguille d'Étretat*, or *Étretat needle*, is given. The eastern part of the beach at *Étretat* is bordered by rocks, which uncover at low water.

Abreast *Étretat* the shoal bottom, with less than 8 fathoms on it projects a mile to the N.N.W. from the shore, and when the flood stream is at its greatest strength it occasions a great eddy, named by the mariners of the coast the *Hardiers*, which extends to the eastward as far as the *Vaudieu* rock, and makes the sea hollow and heavy when the wind is fresh from the eastward.

IPOINT, a fishing village situated W. by S. $\frac{1}{2}$ S. $2\frac{1}{2}$ miles from the entrance to *Fécamp*, is built, like *Étretat*, at the entrance of a valley upon low land near the sea, and sheltered by a natural dyke of shingle, which is strengthened by a small stone jetty. The beach in front of the village is encumbered with rocks, which uncover at low water, and is only accessible to fishing boats. The bluff point of *Chicart*, and the rocks at the foot of that point, afford a little shelter to the beach against westerly winds, but it is quite open to the northward, and when the sea is high the boats are hauled upon the dyke.

Between *Étretat* and *Ipoint*, at $1\frac{1}{2}$ miles from *Étretat* point (called also *porte Orientale* or the Eastern gate, and less than a cable from the cliffs), is the *Guillemot* rock, which resembles a ruined column, and rises 160 feet above the rocks that uncover along the shore. Halfway between this rock and *porte Orientale*, but a little nearer the cliffs than the *Guillemot*, is the great *Vaudieu* rock, about 53 feet high. These two rocks, like the *Étretat* needle, seem to be the remains of ancient cliffs. The base of the *Guillemot* is so worn by the sea that it is probable that it may fall ere long.

FÉCAMP, a commercial, fishing and refitting port, is situated at the entrance of a fine valley watered by the rivers *Valmont* and *Ganzeville*. It consists of a small bar tidal harbour, and at the bottom of the harbour is a basin which will admit vessels of 12 or 13 feet draught at high water ordinary springs, in which they may at all times lie afloat.*

The entrance channel to the harbour is open to the N.W. by W., and runs between two stone jetties, 181 feet apart, at the foot of the high cliff forming *Fagnet* point. When there is no shingle at the entrance, the bottom of the channel, which is of hard white porous stone, dries 3 feet above the lowest tides. The south jetty is only 172 feet long, and was built at the end of the natural dyke, which shelters the harbour, to arrest the progress of the shingle along the coast from the south-west, and to oblige

* See enlarged plan of *Fécamp*, on Admiralty chart, No. 2,612.



The Basin, which occupies a surface of about 21,891 square yards, is constructed in the south-west angle of the reservoir for scouring out the harbour, and where all the running streams of the valley have been united. Two of its sides are formed by embankments of earth, but that towards the south is bordered by a quay of 754 feet in length. The basin communicates with the outer harbour by means of a lock 33 feet wide, the sill of which is $8\frac{1}{2}$ feet above the level of the lowest tides, and it will admit vessels of 12 or 13 feet draught at ordinary springs.

LIGHTS.—Fécamp lighthouse, 56 feet high, stands on the summit of Fagnet point, at about 93 yards from the edge of the cliff, and exhibits at 426 feet above high water, a *fixed* white light, dioptric and of the first order, visible 18 miles; but the position it occupies, upon the crest of an abrupt hill at the edge of a deep valley covered with meadows and watered by abundant streams, causes it to be frequently obscured by the mists, or completely hidden by fogs.

Fécamp harbour is pointed out at night by a *fixed red* light on south jetty, visible 5 miles, whilst a *fixed* white light, varied by a bright *flash every three minutes*, is shown, whilst there are more than 10 feet water in the entrance channel, from a small stone tower standing 58 yards from the extremity of the north jetty; the light is dioptric and of the fourth order, elevated 39 feet above high water, and visible in clear weather from a distance of 10 miles. A vessel approaching the harbour from the eastward will not open this light till it bears to southward of S.W. by W., as it is masked by the projecting part of Fagnet cliff when to the westward of that bearing. The time during which the harbour is accessible by day is made known by a large national flag hoisted at the head of a staff on the north jetty, and it is kept up as long as there are more than 10 feet in the entrance.

Directions.—Fécamp harbour is difficult to enter at all times, and dangerous to attempt when it blows strong from the westward, on account of the heavy sea at the entrance; for should a vessel at that time miss the harbour and ground upon the rocks off Fagnet point, she would be totally lost. When it is impracticable, the flag or the light is not shown from the north jetty. Every assistance is given to warp or track vessels when entering or leaving the port, and when the weather permits boats manned by the coasting pilots are ready at the entrance.

Vessels arriving off the harbour towards low water, with the wind between W.S.W. and W.N.W. should steer for the land about Étretat, and keep a position to windward of the harbour till the tide serves to run in. With the wind between N.N.W., round northerly and E.N.E., the land should be made about Vattettot and Iport; and if the wind should come off shore, and there is apprehension of losing the tide, anchorage will be found about $1\frac{1}{2}$ miles from the coast, near the meridian of Iport, in 10 fathoms water, tolerably



point being given with Euxine bells in use with ports Orientale, and the tower of the Abbey at Fécamp in line with the last slope of the hills, lies to the southward of the houses of the town. On arriving only one or three hours before high water, a vessel might anchor closer in shore, but a position should always be chosen so that she may be able to fetch the entrance of the harbour. These anchorages, however, are only good for a few hours, unless the weather is quite fine.

One of the difficulties when entering Fécamp harbour is the stream of flood, which continues to be felt at the jetty heads for about half an hour after high water in the harbour, and runs even at that time $1\frac{1}{2}$ knots at a cable outside the head, so that a sailing vessel approaching the entrance on the starboard tack is generally driven to leeward of the north jetty, and misses the port. With a fair wind, or when close hauled, sufficient sail should be carried to get quickly into the harbour, and it must be so balanced that the helm may be answered with the greatest promptitude. With the wind from the northward violent gusts come down from the high land to the northward of the entrance.

The method generally adopted when entering the harbour with a fair wind is to stand for the south jetty head, and then drift towards the middle of the north jetty; the sails may then be clewed up, and the vessel will be tracked in. If intending to enter the basin, the harbour should be entered at least three-quarters of an hour before high water; but if the vessel is to remain in the harbour, it may be entered later.

Caution.—Care must be taken on quitting Fécamp harbour with westerly wind, to avoid being drifted by the flood on the Charpentiers shoals, which join the rocks at Fagnet point, and extend to the westward as far as the line on which St. Léonard church spire is in one with the north jetty head, S.S.W. To pass well outside the swell caused by these shoals, keep Grinval valley open, so that the new guard-house may appear above the middle of the cleft by which the descent is made to the beach.

Tides.—It is the high water, full and change, in Fécamp harbour at 10h. 44m.; springs rise $23\frac{1}{2}$ feet; neaps 18 feet. Above the bottom of the entrance channel, abreast the middle of the north jetty, ordinary springs rise 22 to 23 feet, equinoctial springs about 25 feet; but these heights are given with the supposition that the entrance channel is cleared of all the shingle that is occasionally deposited there. When the wind blows strong from the westward for several successive days, the tide rises one or 2 feet higher in the harbour; but there is then a heavy sea at the entrance; the contrary is the case with the wind from the eastward. The mean duration of slack water is 15 or 20 minutes at the utmost.

The COAST from Fécamp trends E. by N. 10 miles to Catellier point and then E. $\frac{1}{4}$ S. 5 miles to St. Valéry-en-caux, and is formed of high



perpendicular cliffs of chalk and flint, intersected by numerous valleys, the greater part of which do not reach down to the beach. A shelf of irregular rocks, which uncover at low water, borders the shore, but those parts of it which project farthest out do not extend more than about 3 cables from the cliffs, so that large vessels may approach the shore to about half a mile at any time of tide.

The appearance of this part of the coast is dull and uniform, and the land seen above the cliffs is apparently level and only overtopped by the clumps of trees surrounding the farms and villages. Above these trees there occasionally appear some church towers, the most conspicuous being those of Senneville, Sassetot, St. Martin-aux-Bunaux, Conteville, and St. Léger; the last named, which stands near the edge of the cliff three-quarters of a mile to the westward of St. Valery, is a tall isolated spire, and may be seen from a great distance in the offing.

ST. VALERY-EN-CAUX, a small bar harbour used for shelter and refitting, is situated at the entrance of a narrow valley enclosed between high hills, and will admit vessels of about 14 feet draught at high water ordinary springs when the bar is not too high; but only fishing and small coasting craft can frequent it during the neaps. The mackerel, herring, and cod fisheries are carried on at this port, and Baltic and Norway timber, wine, brandy, &c., are imported.

The port consists of a channel, formed between two jetties of unequal length, leading into a small tidal harbour, and of a reservoir for backwater, the surface of which is about 67,000 square yards, used for scouring out the harbour and the entrance. A floating basin in the form of a parallelogram, 328 feet long and 164 feet wide, is constructed in the south-west part of the reservoir, and communicates with the harbour by means of a small lock with sluice gates. The lock is $29\frac{1}{2}$ feet wide, and the sleepers $9\frac{1}{2}$ feet above the level of the lowest tides.

The valley of St. Valery, of which the town and harbour occupy the entrance, is about 2 cables wide, and situated at the bottom of a small elbow formed by the falling back of the coast. The rocky ledge which uncovers at the foot of the cliff along the coast has an opening in it in front of the valley, and the space between is made up with a beach of chalky mud and cemented shingle $2\frac{1}{2}$ cables wide, upon which the shingle driven from the westward by the surf during high winds from that quarter is deposited. The channel leading to the harbour runs across this beach, and the jetties between which it passes takes a S.E. by S. direction; the length of the western jetty is 377 yards, including open pile work of 129 yards, and the eastern jetty 169 yards.

Bar.—The beach uncovers during springs one cable outside the western jetty, and the shingle borne from the westward forms on it a bar

a force of water strong enough which almost always joins the western jetty head. The scouring water not having force enough to open passage through the bar runs out in the direction of its eastern end. The bar runs of necessity with the ebb, and a south-westerly gale brings up an immense mass of shingle upon the beach: the higher the bar the more it extends to the western edge of the bar, the outer part of the channel to the eastward.

The entrance is sometimes completely closed by the shingle: when this occurs it requires to be cleared by manual labour, and increased by repeated scourgings, but it remains a long time obstructed and difficult of access. When strong easterly winds blow for any length of time, the surf drives the shingle from the entrance, lowering the bar and dividing it into several parts, which if taken advantage of by scouring out, the channel is sometimes completely cleared, and leads in a straight direction as far as the western edge of the beach, passing close to the western jetty head.

Harbour.—The interior of the harbour of St. Valery is surrounded by quays, and well sheltered, except against northerly winds which send a swell into it. When these winds blow strong, the surf is sometimes so great that vessels are in danger of breaking from their moorings, and it is to obviate this inconvenience that the floating basin has been made. The bottom is a mixture of mud, gravel, and sand, and as the mud is in great quantity the grounding berths are good. Vessels should be placed parallel to the quay, and the moorings must be watched as the back water is let down, for the harbour being very narrow, the scouring water spreads itself over its surface, and its rapidity is such that it will undermine the bottom under those which have grounded either across or oblique to its direction. There is a small repairing slip at the entrance of the harbour, and a crane on the western quay for masting small craft.

LIGHTS.—At the extremity of the west jetty at St. Valery-en-caux from an iron post a *fixed* white light is exhibited whilst there are more than 8½ feet water in the entrance channel; the light is elevated 27 feet above high water, and may be seen in clear weather from a distance of 7 miles. A *fixed red* light is also shown from the end of the east jetty. During the day a large national flag is kept flying on a flagstaff erected in front of the light tower while the above depth is in the entrance channel. When vessels of different sizes are off the harbour waiting to go in, the flag is hoisted half mast as soon as there is water in the entrance for those of the smaller draught, and hoisted quite up when there is sufficient water for the others.

Directions.—Vessels unable to enter St. Valery-en-caux harbour during the neaps must keep at sea until the springs, except with off-shore



winds in fine weather, when they may anchor at from half to three-quarters of a mile from the shore, between the guard-house at Cinq Troues and St. Léger, in 5 to 10 fathoms water, over tolerably good holding ground. If they arrive off the entrance at the springs, and have only a few hours to wait for sufficient water to enter, they should, with westerly winds, make short boards between Catellier point and St. Léger, or if the wind is from the eastward they can keep a position off the harbour. In standing in shore to the eastward of the entrance, care must be taken to keep Catellier point well open to the northward of the point formed by the cliffs near Sussette valley, bearing about West, to avoid a dangerous bank of sand and gravel named the Ridens, lying E. by N. $\frac{1}{2}$ N. three-quarters of a mile from the west jetty head, upon which are only 2 feet at low water, and a high sea during a weather tide.

There is no difficulty in entering the harbour, whatever may be the direction of the wind, provided the entrance channel runs at the foot of the western jetty head, and when the wind does not admit of sailing between the jetties a vessel will be tracked in by a crew always in attendance; but it is difficult of access when the bar joins the foot of the jetty head and the channel opens to the northward, and it would then be imprudent to attempt it, with the wind between South and West, without a pilot. When the state of the sea prevents the pilots going out, they attend on the jetties to point out by signals the course to be followed to round the bar and enter the channel.

The most favourable moment to enter with westerly winds is when the *Sciade* or eddy is at its greatest strength, that is, from half an hour before to half an hour after high water, but the anchors must be clear and sufficient sail carried for the vessel to answer her helm quickly. With winds between North and East, it is advisable to enter before the *Sciade* has acquired its full strength, for fear of being drifted upon the west jetty. With northerly winds there is a high sea upon the bar, and sail should be carried in crossing it, as the wind reflected by the cliffs decreases the force of the true wind, and if the surf is not crossed rapidly a heavy sea may be shipped.

There is not much difficulty in quitting the harbour, as it can only be attempted in moderate weather, but care must be taken to choose a favourable time of tide; thus with easterly winds vessels should leave the jetty before high water, whilst the flood stream has still much strength, and with westerly winds they should not leave until the ebb stream is well established.

Tides.—It is high water, full and change, at St. Valéry-en-caux at 10h. 46m. springs rise 27 feet; neaps $21\frac{1}{2}$ feet. The bottom of the entrance channel, from the foot of the west jetty head to the eastern edge of the bar



RAZOR SH. MICHEL. This bank occupies the west side of the river at the mouth of the St. Michel. The water here is separated by a narrow channel from the main body of the river Dun. The rocks are scattered along the shore under the water. The rocks are mostly of the same kind as those found on the shore on both sides of the river. In front of it an irregular rocky bottom extends a mile from the shore, where the depth is from 14 to 20 feet. This extension, lying at right angles with the tidal streams, causes a strong eddy, named the raz or race of St. Michel, which is dangerous at low water to small vessels sailing near the coast with off-



shore winds; but Catellier cliff kept well open of the point formed by the cliffs near Sussette valley bearing about West leads outside it.

POINTE D'AILLY is of a rounded form, and although less elevated than many other points of the coast, may be easily recognised, as the perpendicular chalk cliff forms only half its height. A thick bed of clay and vegetable mould, lying on the top of the chalk, slopes down to the edge of the cliff.

LIGHT.—A little within pointe d'Ailly stands a tower, 66 feet high, which exhibits at 305 feet above high water, a *revolving* white light, the eclipses of which take place *every minute*, but are not total within the distance of 12 miles. The light is dioptric and of the first order, and in clear weather should be seen from a distance of 27 miles.

Roches d'Ailly.—The shore eastward and westward of Ailly point, from the valley of Pourville to that of Quiberville, is bordered by a bank composed of blocks of freestone, named the Roches d'Ailly, which uncover at low water, and terminate in a point half a mile to the N.N.E. of the lighthouse. A rock called the Galère, higher and larger than the others, rises from the middle of the bank, and when its summit is covered there are about 20 or 21 feet water in the entrance to Dieppe. The square church tower of St. Jacques, at Dieppe, kept on an E. by S. $\frac{3}{4}$ S. bearing, leads half a cable to the northward of the bank; the tower on this bearing will appear 2° or 3° open to the eastward of the cliff, upon which the ramparts of the castle are built.

Grands and Petits Ecamias and Riden de Dieppe.—It is on the meridian of Ailly point that the western part of those heaps of sand and broken shells is found, named Ridens or Ridges, (noticed in page 95,) which extend 11 miles in the offing, and to the eastward as far as the meridian of Tréport. Those lying to the northward of Ailly point are divided into two groups, and as they have not less than 7 fathoms water over them, and from 12 to 15 fathoms around them, they can only be dangerous in bad weather; the northern group, named Petits Ecamias, lies 7 miles, and the southern group, Grands Ecamias, 4 miles from the shore.

The Ridens generally are not dangerous, but the sea runs high in the eddies formed by them on a weather tide. The Riden de Dieppe, however, (known to the mariners of Tréport as the Frilandais,) which lies N.N.E. $\frac{1}{2}$ E. 10 miles from Dieppe, is an exception to this rule, for vessels of large draught might strike upon it at low-water springs; and small vessels are liable to ship heavy seas when crossing it in bad weather. When this part of the coast was surveyed in 1835 it was 2 miles in length, in a N.N.W. and S.S.E. direction, the highest part being half a mile long, with from 23 to 27 feet water on it at the lowest tides.

As it is probable that these Râles, being composed of substances easily set in motion, are liable to change their position, the mariner will act prudently when in their vicinity, by keeping at a distance from any great eddies, the strength of which is in proportion to the shallowness of the water that occasions them.

Tides.—The tidal streams follow the direction of the coast between St. Valéry-en-caux and Dieppe, and their rate at springs is about $3\frac{1}{2}$ knots; but near Sotteville and Ailly points they run 4 knots.

PORT de DIEPPE.—This commercial and fishing port lies E. by S. 5 miles from Ailly point, and with the town and suburb of Le Pollet occupies the entire entrance of a valley, nearly a mile wide, which is watered by the rivers Arques, Béthune, and Aune. The population of Le Pollet suburb, which is situated to the eastward of the town and joined to it by a flying bridge, are all engaged in the herring, oyster, and cod fisheries. There are sugar refineries, rope-walks, paper-mills, and ship-building yards in the town. The coasting trade is active. Steamers ply daily to Newhaven on the coast of Sussex. The population in 1861 amounted to 20,187.

The port consists of a tidal harbour, or Avant-port, which is $2\frac{1}{4}$ cables long, and three-quarters of a cable wide, two floating basins, and a capacious reservoir of scouring water. The harbour is sheltered from all winds, and will admit vessels of about 22 feet draught at high water ordinary springs when there is no swell on the bar, and of about 15 feet at neaps. When the state of the sea is such as to prevent the pilots from boarding vessels in the offing, they remain on the jetty heads and direct them by waving their hats. Those drawing less than 10 feet can enter the channel 2 hours before high water in the harbour, and with a fresh leading wind they may run in 2 hours after high water; vessels of large draught are taken in by the pilots during the last hour of the flood. The berths alongside the quays of the town are composed of a mixture of mud and shingle, and their elevation is about 15 feet above the level of the lowest tides. The berths alongside Le Pollet suburb are about the same height, but they are exposed to the surf when the sea is high at the entrance.

A Lifeboat is stationed at this port.

The Entrance Channel lies on the eastern side of the valley nearly 2 cables from the high cliffs of Femme-Grosse point, and is open to the N.N.W. It is enclosed between the northern part of the quays of the town and Le Pollet suburb, and forms a curve $3\frac{1}{2}$ cables long from the harbour. The outer part of the channel is liable to be obstructed at times by the shingle which is driven along the shore during westerly winds and accumulates in front of the entrance, where it sometimes forms a high



bar. The shingle also gets into the channel at the neaps, when blowing hard from the northward.

The bottom of the channel is of the same nature as the cliffs along the coast, and is generally covered with a layer of shingle, but when it is clear it is about a foot above the level of low-water great springs across by the east jetty head, and 5 or 6 feet above the same level at the entrance to the harbour; the bar has been sometimes 6 feet above the same level, and has joined the west jetty head. A high sea runs on the bar with winds from W.S.W., round westerly to N.E., and those from the westward cause a heavy confused sea at the entrance.

Floating Basins.—The outer floating basin called Bassin Duquesne is 2 cables long and two-thirds of a cable wide, and is separated from the Avant-port by a dam with flood gates, which are 54 feet wide, their lower sill being 6 feet 2 inches above the level of the lowest tides; quays border it on all sides, and it communicates with the other floating basin by gates 46 feet wide, the lower sleepers of which are 7 feet 3 inches above the same level. The surface of the reservoir of scouring water is about 500,000 square yards, and it is estimated that during the first hour of the sluices being open it will discharge 560,000 cubic yards. The waters of the rivers which fertilize the valley run partly into the reservoir, and partly into a canal joining the upper part of the outer basin with which it communicates by a valve gate.

LIGHTS.—The following lights have been established on the jetties at Dieppe, to point out at night the time that the entrance channel is practicable:—

A *fixed* white light, dioptric and of the fourth order, is shown, at 43 feet above high water, from a stone tower standing 38 yards from the head of the west mole, and should be visible in clear weather from a distance of 10 miles. This light is shown as soon as there are $10\frac{1}{2}$ feet water in the entrance channel, and extinguished as soon as the ebb stream commences, which occurs about a quarter of an hour after high water.

Three *fixed* white lights are attached to a mast standing 11 yards from the east mole head.

The first is a permanent light, shown throughout the night at 23 feet above high water, and visible 6 miles off.

The second is a tidal light, placed 8 feet above the permanent light, and shown from $2\frac{1}{2}$ hours before till 2 hours after high water.

The third is also a tidal light, placed between the former two; it is lighted 2 hours before high water, and extinguished at high water.

The two latter are only lighted when the state of the sea is favourable for access to the harbour. The mast which carries the lights is kept in a vertical position while the vessel preserves her proper course; but should

The signal for the entrance of the harbour is shown by a large flag on the mast of the light tower. The flag is hoisted at the same time as the signal on the shore, and is hoisted at the same time as the signal on the shore.

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A vessel is required to keep within the extremity of the west pier: and to enter the depth of water in the channel is a strong current, only for two minutes, and then is a current of about 1000 fathoms. One ring in the lower part indicates 10 feet of water in the channel, two rings 15, feet, and so on.

Directions.—The hill separating the valleys of Pourville and Dieppe, and the chapel of St. Nicolas both on the summit of the hill are marks that will assist in recognizing the position of Dieppe when approaching it from the north or the north-west. The valley of Pourville is the most remarkable valley on this part of the coast, being the only one that descends to the beach; it is watered by the little river Seine, which finds a passage through the shingle to the sea.

A vessel of large draught arriving off Dieppe during the neaps is entitled to a pilot to take charge of her at sea, until there is sufficient depth to enter at the springs. When standing for the land with westerly winds towards the hour of low water, a position should be maintained, by making short tacks between Ailly point and St. Nicolas chapel, till there is water to run for the west jetty head; with easterly winds a vessel should keep on the meridian of the chapel. With off-shore winds in fine weather, or in a calm, she may anchor for a few hours in $3\frac{1}{2}$ fathoms water, about half a mile from the shore to the North or N.N.W. of St. Nicolas chapel. The name of Dieppe road has been given to this anchorage, but as it affords no shelter with northerly winds, it should be left with all speed, and a good offing gained as soon as there is an appearance of a change.

In standing for the harbour, the west jetty head should be steered for, whatever may be the direction of the wind, because the flood stream as far as half a cable outside the jetty heads, continues to be felt 40 minutes after high water in the harbour, and runs to the eastward at the rate of $1\frac{1}{2}$ knots during the whole time vessels of large draught might enter. If this precaution be not taken with a light wind, the vessel will



be drifted to the eastward of the channel. The west jetty head should be approached with caution, and when there is no pilot on board sufficient sail should be carried to execute quickly any change of course the pilots on the jetty may direct by waving their hats.

Moderate winds between N.N.W., round northerly, and E.N.E. are the most favourable for entering Dieppe; with all other winds it will be necessary, after the bar is crossed, for a vessel to steer for the windward jetty to be tracked in. The direction of the valley of Dieppe has a great influence upon off-shore winds; thus if the wind is E.S.E. in the offing it will be found S.S.E. at the entrance of the harbour, and if West outside, it will be S.W. in the harbour and entrance channel. A W.S.W. wind is reflected by the high cliff between Le Pollet suburb and Femme-Grosse point, and its force is much weakened; a vessel therefore, running for the harbour with the wind between W.S.W. and W.N.W. should carry considerable sail to cross the bar and broken water which is caused by these winds at the entrance.

Tides and Tidal Signals.*—It is high water, full and change, at Dieppe at 11h. 6m.; springs rise 27 feet, neaps $20\frac{1}{2}$ feet. When the bottom of the entrance channel, across by the east jetty head, is clear of shingle occasionally deposited there, the tide rises upon it about $28\frac{1}{2}$ feet at ordinary springs; 31 feet at equinoctial springs; and 22 at neaps. Three feet must be deducted from the above quantities for the rise above the bar when in its medium state; 3 feet for the entrance of the harbour; 6 feet for the berths at the Dieppe quays; 9 feet for the sill of the flood-gates of the outer floating basin; and 11 feet for the sill of the inner basin. Fresh westerly winds cause the tide to rise a foot or 18 inches higher than in calm weather, and easterly winds have a contrary effect. The greatest tide takes place about 52 hours after the conjunction; and the smallest tide occurs about 63 hours after the quadrature. The mean duration of the flood on the beach at Dieppe is 5h. 40m., and that of the ebb is 6h. 45m.

The tidal signals for indicating the depth of water in this port are the same as those noticed in page 3.

The COAST from Dieppe trends about E. by N. $\frac{1}{2}$ N. $13\frac{1}{2}$ miles to Tréport, and like that which precedes it to the westward, consists of a high perpendicular cliff of chalk and flint, intersected by numerous valleys. The land adjacent to the cliff is slightly undulated, the highest parts being in the vicinity of Penly village and on the western point of the entrance of Criel valley, where the cliff is surmounted by a remarkable conical mound covered with heath, named Mont Joli Bois, the base of which is half a mile wide.†

* For day signals, see page 3, and for night signals, see page 107.

† See Admiralty chart :—North coast of France, sheet XIII., Dieppe to Boulogne, No. 2,611; scale, $m = 0.5$ inch.

The valleys that may be recognized from the offing are Puits, Belleville, Berneval, Penly, Neuvillette, Criel, and Mesnil. Puits valley descends to the shore at a mile to the eastward of Dieppe, and at the top of its eastern steep edge are the remains of an ancient Roman encampment, named *Camp de César*. The valleys of Berneval and Penly, the third and fourth to the eastward of Dieppe, are separated by perpendicular high land a third of a mile in length, and communicate with the beach by ravines which the floods of rain have hollowed out. Criel valley, situated at the foot of Mont Joli Bois, is half a mile wide at its entrance, and is watered by the little river Yères, which reaches the sea by forming a passage for itself through the bank of shingle at the entrance of the valley. The valley of Mesnil lies 2 miles to the westward of Tréport, and the bottom of it almost reaches the beach.

Roches du Heaume.—The whole of the above coast is bordered by a rocky ledge, which uncovers at low water, and a large quantity of shingle is heaped up at the foot of the cliffs. The ledge, throughout the greater part of its extent, is not more than 2 cables wide; but in three places it projects further out, and is dangerous to small vessels hugging the coast with off-shore winds.

The western projection of this ledge runs out half a mile from the shore, in front of Berneval and Penly valleys; the rocks are uneven, and the highest heads, named *Roches du Heaume*, lie at the outer edge of the ledge, and uncover 5 or 6 feet at low water.

Roches du Muron.—The second projection of the above ledge fronts the valley of Mesnil; it extends 4 cables from the shore, and upon it are a rocky group named *Roches du Muron*, which bear N.W. 3 cables from the guard-house at Mesnil, and uncover 8 feet.

Les HAUMES and Les GRANGES.—The eastern projection of the above ledge lies three-quarters of a mile to the westward of the entrance to Tréport and $3\frac{1}{2}$ cables from the cliffs, and consists of small ridges of rock rising from the sand of the beach; the western ridge, named the *Haumes*, has several heads, the highest of which uncovers $8\frac{1}{2}$ feet at low-water springs; the eastern ridge, called the *Granges*, lies nearly 4 cables from the west jetty at Tréport, and its highest part, forming the south-east point of the ridge, uncovers 6 feet, and its northern part, lying N.W. by W. $\frac{1}{2}$ W., nearly 4 cables from the jetty head, uncovers only a foot. Between the *Granges* and the *Haumes* there is an isolated rock which uncovers $14\frac{3}{4}$ feet. A beach of muddy sand and gravel dries at low water in front of the rocks bordering the shore, from abreast of Belleville valley to the rocks at the foot of Mers cliff, east of Tréport valley.

Between the meridians of Dieppe and Tréport, the bottom is uneven, and the depths irregular as far out as 4 or 5 miles from the shore. The principal inequalities met with are those heaps of sand and broken shells



named the *Ridens de Belleville*, *de Neuville*, *de Tréport*, and *le banc Franc-Marqué*.

Ridens de Belleville lying about 3 miles from the shore in a N.N.W. direction from Berneval valley, are narrow ridges running parallel with each other in a N.N.W. and S.S.E. direction, the least water on them being about 25 feet. The tidal streams occasion strong eddies amongst these ridges, and small vessels would subject themselves to a heavy sea in crossing them in bad weather during a weather tide.

Ridens de Neuville are small narrow sand-banks, upon which there are from 4 to 5 fathoms at the lowest tides. They commence about 6 cables from the shore abreast Neuville valley, and extend nearly 2 miles into the offing. The eddies upon them are in general less dangerous to small vessels than those on the *Ridens de Belleville*.

Ridens de Tréport are four narrow ridges running parallel with each other in a N.N.W. and S.S.E. direction, at from $2\frac{1}{2}$ to $3\frac{1}{2}$ miles from the coast, and occupying the space of a mile from east to west. The westernmost ridge, lying N.W. $3\frac{1}{4}$ miles from the entrance of Tréport, has only 22 feet water on it; the others have 23 and 25 feet on their highest parts.

Banc Franc-Marqué, lying with its west extreme N. $\frac{3}{4}$ E. $1\frac{1}{4}$ miles from the entrance of Tréport, is $1\frac{1}{2}$ miles long in an E.N.E. and W.S.W. direction, and half a mile broad, carrying a depth of from 13 to 17 feet. It appears to be a continuation of a bank, equally shoal, which joins the shore and trends to the W.S.W.

Anchorage.—The holding ground is in general good along the coast between Dieppe and Tréport, and vessels may anchor there with off-shore winds during an adverse tide, but a position must be taken so as to be able to gain an offing should the wind change and blow upon the land. From Mont Joli Bois to Tréport there are many patches of a black substance met with, which appear to be peat, and the anchors penetrate them so deeply that they are difficult to weigh. A bottom, upon which the soundings are less than 5 fathoms, extends a mile from the shore in front of Criel valley and Tréport, and its outer edge runs parallel with the coast as far as the meridian of Mers; it then turns back to the westward round the Franc-Marqué bank, leaving a small deep, with 5 fathoms water in it between the bank and the shore, with excellent holding ground.

TRÉPORT is a commercial and fishing port, situated at the entrance of Bresle valley, the last valley but one to the eastward of all those which break the outline of the uniform cliffs between cape Antifer and the river Somme. The entrance is half a mile wide, between abrupt hills rising 295 feet above high water, and at the foot of the cliff, in the southern part of the valley, stands the town of Tréport, the houses of which are over-



topped by a terrace and a large church built half-way up the hill. The village of Mers is built upon the slope of the hills, in the northern angle of the valley, and a little to the eastward of it, on a plain surrounded by hills covered with wood, rises the Royal residence of the town of Eu.

The port consists of an entrance channel, formed between two wooden jetties, a tidal harbour, a floating basin, and an immense reservoir of scouring water, immediately behind the harbour, with a surface of 200,000 square yards, communicating with the river Bresle by means of the Penthievre canal. As the entrance channel is sometimes obstructed by a bar, rising 3 and 4 feet above the bottom of the channel, the harbour will at that time only admit vessels of about 12 feet draught at high-water ordinary springs; but, as it lies almost at the bottom of the elbow which the coast forms between capes Antifer and Gris-Nez, it offers a refuge at the springs to small craft that may be drifted in upon the land between Dieppe and the mouth of the river Somme, either by the flood stream or strong winds from the westward. Pilots can always be obtained in moderate weather, and it will be prudent to take one when the state of the bar is not known.

Bar.—The beach, which uncovers in front of the entrance as far as one quarter of a mile outside the jetty-heads, is bounded to the westward by the Haumes and the Granges rocks, and to the eastward by the rocks that dry at low water at the foot of the high cliffs at Mers point. It is composed of a mixture of sand, gravel, and shingle cemented together with chalky mud, and forms a hard ground, upon which a high sea runs when the wind blows upon the shore. With hard N.W. winds the shingle brought from the westward with up-channel winds, accumulates before the entrance channel and forms a bar which joins the west jetty-head, and extends thence to the N.N.E. and N.E. Should a continuation of westerly gales bring a large quantity of shingle upon the beach, the bar then forms a high round ridge which is difficult for the scouring water to break through, and during the time this ridge exists the channel turns to the N.N.E. and N.E. and gives some trouble to enter it with southerly winds.

The Entrance Channel is about a cable long, in a N. by W. direction, and its eastern side is enclosed by a wooden jetty, abutting against the western extremity of the natural bank of shingle which protects Bresle valley from the invasion of the sea, and shelters the harbour from the northward; its western side is bounded by the wall, which supports the terrace joining the quays of the harbour, and by an open pile-work, the top of which serves as a road for the tracking crew and a communication, between the terrace and the west jetty-head. The west jetty is only 109 yards long, and join the terrace near the commencement of the open pile-work.

The Harbour is only $1\frac{1}{2}$ cables long and half a cable wide. The



freestone bottom is visible almost throughout its whole extent, but at the foot of the quays it is covered with mud sufficiently soft to ground on. Vessels lie alongside the quay on the southern side of the harbour, but the most level berths and the most water are alongside the quay on the western side where those of 10 feet draught lie aground for three day only at the neaps, and are well sheltered from the swell, which runs into the harbour from 2 hours before to 2 hours after high water when the wind blows strong on the shore.

The harbour has been much improved by turning a part of the course of the river Bresle into a floating basin, and forming that river into a canal from Tréport to Eu, and constructing a small wet dock in the north-west part of that town. The lock basin is 26 feet wide at the bottom, and $147\frac{1}{2}$ feet long, communicating with the harbour and the lower part of the Bresle by means of floodgates, and retains at all times a depth of 13 feet to enable vessels that can enter Tréport to remain afloat.

LIGHTS.—A red brick towers stands 25 yards from the west jetty head at Tréport, and a *fixed* white light is shown from it as soon as there are $6\frac{1}{2}$ feet water in the entrance channel, and extinguished three-quarters of an hour after the moment of high water; but if from any cause the entrance becomes impracticable during these times of tide, a *red* light is shown instead of the white one. The light, which is dioptric and of the fourth order, is elevated 36 feet above high water, and visible in clear weather at 10 miles. A *fixed red* light, visible 5 miles, is shown from the extremity of the east jetty.

During the day a large national flag is hoisted on a mast on the end of the east pier when there are $8\frac{1}{2}$ feet in the channel, and is kept up until high water; but as soon as the ebb commences it is lowered to half-mast, in which position it remains while there is sufficient water for the fishing boats.

When the tide does not rise sufficiently high at the neaps to admit vessels of more than $6\frac{1}{2}$ feet draught, the light is only shown at night at the moment of high water, and extinguished 5 or 6 minutes after. In the same manner the flag is hoisted during the day and hauled down 4 or 5 minutes after.

Fog signal.—A bell is sounded in foggy weather from the west jetty.

Directions.—If a vessel's draught will admit of her entering Tréport harbour, she will have nothing to fear in ordinary weather from the banks and Ridens in its vicinity, but they must be avoided when there is much wind, as she might then ship some heavy seas. In running for the harbour from the westward, or northward, with westerly winds, the land should be made about Criel valley, under Mont Joli-Bois, so that if she arrives long before high water a position may be retained to windward of the harbour



until there is sufficient depth to enter. At night the lights of Ailly and Cayeux are excellent guides for Tréport.

There is anchorage with off-shore winds and smooth water, to stop-tide, in 7 fathoms, over broken shells and sand, at 2 miles to the westward of Tréport and $1\frac{1}{2}$ miles from the shore abreast Mesnil-Val, but vessels must be prepared to weigh should the wind come in from the offing. This anchorage is named the *Petite rade* by the mariners of Tréport; that which they call the *Grande rade* is half a mile farther from the coast, and vessels having to remain some time for water to enter the harbour may anchor in it, over a muddy bottom and excellent holding ground, with off-shore winds as long as the weather is fine, but they should weigh immediately and quit the coast on the appearance of a change.

When running for Tréport with a strong S.W. wind, the western of the three windmills at Ault must be kept a point open to the northward of Siez cliffs E. $\frac{3}{4}$ N., to avoid passing too close to the Haumes and Granges rocks, on which the sea breaks even at high water. Vessels of large draught should endeavour to enter between the periods of half an hour before and half an hour after high-water springs; and as the flood stream runs at the rate of from $1\frac{1}{2}$ to 2 knots at 3 or 4 cables outside the jetties, and continues to be felt with less velocity until $1\frac{1}{2}$ hours after high water, they must take care they are not drifted to leeward of the entrance, which however is rarely missed in moderate weather, but it sometimes happens with strong S.W. winds when the entrance channel turns to the north-eastward.

The pilots cannot go out to meet vessels when the sea is high upon the beach and the bar; in running for the harbour, therefore, with strong winds from the offing, the anchors should be clear for letting go, the hawsers coiled on deck, an anchor ready to moor by the stern, and sufficient sail carried to perform any necessary manœuvre. These arrangements being made, steer so as to pass close to the west jetty-head where the pilots will be found, who will point out by signs the various changes to be made in the course to cross the bar and to enter the channel.

If with a strong westerly wind a vessel be driven to leeward of the entrance, she ought to anchor, should the state of the weather permit, and wait until the ebb stream commences, to gain an offing; but if the sea is too high near the shore, where indeed the holding is not good, she should seek for anchorage in the small deep under the lee of the Franc Marqué bank (page 111), where she will be in some degree sheltered, and with two anchors down and a long scope of cable out she might ride out the flood and gain an offing on the ebb. If the wind is too far to the northward to reach this deep or to claw off the coast, the only



resource will be to run stem on the shingle beach with all sail set, as near as possible to the east jetty; the shingle yields readily under a vessel, and if she takes the ground near the top of high water the crew will be saved.

With off-shore winds the harbour should be entered before high water. With a moderate wind and a smooth sea to the beach, a vessel may easily get in close to the west jetty head, where a crew is always at hand to track in. With strong off-shore winds violent squalls come down from the cliffs and out of the valleys, and it often happens that when standing for the jetty on the starboard tack, a vessel is taken aback in the midst of the rollers on the bar.

When leaving the harbour, and bound to the northward, do not go to the eastward of the line on which the eastern extremity of the trees surrounding Grange farm, 1874, situated above Tréport, is seen a quarter of a point open to the westward of the summit of the cliff at Mers point bearing about S.W. by S., as the flood stream runs to the eastward, in proportion as the distance from the shore is increased, for some time after high water in the harbour, and the banks which uncover at the mouth of the Somme river extend as far out as N.E. from the entrance to Tréport.

Tides.—It is high water, full and change, at Tréport, at 11h. 9m., springs rise 27 feet, neaps 21 feet. Above the bottom of the entrance channel (which is $13\frac{1}{2}$ feet above the level of the lowest tides) great springs rise about 21 feet, ordinary springs 18 feet, neaps 12 feet. The banks of shingle which form the bar generally rise 3 and 4 feet above the bottom of the entrance channel, and sometimes much higher. Slack water continues about 10 or 15 minutes at the springs, but with N.E. winds its duration is half an hour.

ASPECT of COAST.—The white cliffs bordering the coast from cape de la Hève terminate at the eastern part of the town of Ault, which lies E. by N. $\frac{3}{4}$ N. 4 miles from Tréport, and occupies the entrance and the north-east slope of a deep narrow valley situated at the bottom of the bight formed between capes Antifer and Gris-Nez. Nine valleys break the uniformity of the aspect of the coast between Tréport and Ault, and the shore is bordered by a rocky shelf which in some places uncovers a quarter of a mile from the cliffs at low water, the sea leaving a narrow beach of hard sand in front of the shelf.

The hills trend in an E. by N. direction from Ault to the left bank of the river Somme, and join by easy slopes the alluvial plain which extends to the sea. This plain is low, marshy, and apparently level, and is defended from the incursions of the sea by a natural dyke of shingle, brought hither by the wasting of the cliffs between Ault and cape Antifer. Behind the dyke, which is 2 cables broad, are meadows and

cultivated lands, and in front of a beach of hard sand which uncovers half a mile out.

The coast between Tréport and Cayeux is inaccessible when the wind blows upon the shore, and a heavy sea runs in upon it during westerly gales. The beach between Ault and the first guard-house to the northward is exposed to all the violence of winds between W.S.W. and N.W., and the high sea occasioned by these winds drives the shingle collected at the foot of the cliffs between Tréport and Ault rapidly towards the guard-house, and beyond it. It frequently occurs, after westerly gales, that there is little or no shingle upon this beach, which has occasioned much remark. Were it not for a small artificial dyke constructed here, the sea would make an inroad upon the plain.

CAYEUX.—The low coast which commences at Ault trends in a straight line to the north-east to the town of Cayeux, which is built on the shore in the midst of sand-hills. The town is partly inhabited by fishermen, and as the coast affords no shelter for their boats, they haul them up above high-water mark in the summer, and in the winter place them for shelter in the little harbour of Hourdel, within the mouth of the Somme.

The only remarkable objects on this part of the coast are the houses of Cayeux, its church, particularly the bell tower, and five windmills situated in and around the town. In westerly gales the sea heaps up upon the shore in front of the northern part of the town a great quantity of sand, which is carried away by the high winds into the interior.

Within a mile to the southward of Cayeux church is a sheet of water named the Hable d'Ault, where the greater part of the fresh water of the plain is collected. Until the year 1767 this Hable (a corruption of the word *havre* or *haven*) communicated with the sea by a channel into which the fishing-boats of Ault and Cayeux, as well as small coasters, could run for shelter; but the successive invasion of shingle filled it up.

Vessels of large draught should not approach the coast between Mont Joli Bois and Cayeux, neither should small vessels, unless bound to Tréport or the river Somme. The depth is only 5 fathoms at $2\frac{1}{2}$ miles from the shore between Tréport and Cayeux; outside of this the soundings increase slowly to 8 and 9 fathoms at 6 miles in the offing. The sand-banks which uncover at the mouth of the Somme extend to the south-west as far as N.W. by W. of Cayeux church; on this bearing they dry out nearly $1\frac{1}{2}$ miles from the shore at spring tides.

LIGHTS.—A round brick tower, which at a distance resembles a Doric column, stands near the shore, $1\frac{1}{2}$ miles to the north-east of Cayeux, and exhibits, at an elevation of 92 feet above high water, a *fixed* white light, varied *every four minutes* by a bright *flash* of 8 or 10 *seconds*



duration; the flash is preceded and followed by a short eclipse. The light is dioptric and of the third order, and visible in clear weather at 14 miles; but the fog, which rises from the low damp ground covered with wood in the rear of the lighthouse, sometimes obscures it.

A *fixed* white tidal light is shewn at 3,827 yards to the S.W. of Cayeux light, to point out the south channel into the Somme. It is lighted at $3\frac{1}{2}$ hours after the beginning of the flood, at the entrance of the channel, and extinguished $1\frac{1}{2}$ hours after the beginning of the ebb.

EMBOUCHURE de la SOMME.—This estuary lies between the town of Cayeux and St. Quentin point, which bear N.E. $\frac{1}{2}$ N. and S.W. $\frac{1}{2}$ S. from each other, distant 6 miles. It is bounded on the south by the plain of which Cayeux occupies the north-west angle, and on the north and north-east by the low lands of Marquenterre and the Favières marshes. The little harbours of Hourdel, St. Valery-sur-Somme, and Le Crotoy are situated within the estuary, the two first on the left and the latter on the right bank. Vessels of about 15 to 18 feet draught can get up to Hourdel harbour at the springs, and of 8 feet draught at the neaps. Le Crotoy channel, when not obstructed by sandbanks, which it sometimes is, allows vessels of 12 or 13 feet draught to get up at ordinary springs. The channel leading up to St. Valery has been so improved that vessels drawing 13 and 14 feet can easily get up to that town, which is the outpost to Abbeville, with which it communicates by a canal $7\frac{1}{2}$ miles long.

Some of the pilots for the river Somme live at Cayeux, and the remainder at Le Crotoy and St. Valery.

Left Bank of the Somme.—From Cayeux the left bank of the river takes a north-east direction for $3\frac{1}{2}$ miles to Hourdel point, and is skirted by an immense quantity of shingle, of an average breadth of 3 cables, which, as far as 2 miles from Cayeux, is covered by sand-hills of moderate height; but from Cayeux lighthouse to Hourdel point the shingle is uncovered, and a series of undulations, parallel to each other, may be remarked on the surface of the soil. Hourdel point in many respects resembles Hoc point, noticed in page 76; both increase by successive deposits of shingle brought by the tide and surf, and the eddy on the flood has given them nearly the same shape.

Between Hourdel point and St. Valery-sur-Somme the shore is low and forms an elbow half a mile deep, the land being defended from the incursion of the sea by an embankment, in front of which is some marshy land and a wide beach, parts of which are hardly covered at high-water springs. The town of St. Valery and the suburb of La Ferté, which forms a part of it, occupy a space of $1\frac{1}{2}$ miles along the shore, and are built on the north slope of a group of hills forming the northern point of

the high land between the rivers Somme and Bresle ; the north-west hill the best seen from the offing, has upon its summit a clump of tall trees and a windmill.

The harbour of St. Valery is at the eastern part of the town, and ends the sea navigation of the mouth of the Somme. Since the waters of this river and the streams flowing into it above Abbeville run out by the canal, the sand, which the flood stream drives into the river, has in a great measure filled up its former bed, and the lighters or discharging vessels (when laden they draw about 3 feet water) can hardly get up as far as the village of Grand Port, on the right bank, 5 miles above St. Valery.

Right Bank of the Somme.—The northern shore of this estuary trends in a N.N.W. and S.S.E. direction, and the most conspicuous object on it is the little town of Le Crotoy, built on a projecting point at $2\frac{1}{2}$ miles E. by S. $\frac{1}{4}$ S. of Hourdel point and $1\frac{1}{2}$ miles N.N.E. of St. Valery ; the ruins of the fortifications, four windmills, showing above the ruins, the church tower, and the roofs of some of the houses serve to mark its position from a distance.

The coast for 4 miles to the eastward of Le Crotoy is low, and an embankment follows all its sinuosities and shelters the adjacent land from invasion by the sea. The south part of St. Quentin point, seen from Le Crotoy, is about 4 miles to the N.N.W. of that town, and in the intermediate space the coast recedes a mile and forms an elbow, at the bottom of which the little river Maié (which receives a large portion of the waters of the Marquenterre) loses itself upon an elevated beach. The only objects that can be seen on this low part of the coast are the windmill at St. Pierre, and the church tower of the village of St. Firmin situate respectively North, three-quarters of a mile, and N.N.E. 3 miles of Le Crotoy.

St. Quentin point is rounded, and forms a slight projection on the shore, at a mile to the northward of the point that is visible from Le Crotoy, and where the coast undergoes a sudden change in its direction. The only object which serves to point out its position from seaward is a guard-house built among the sand-hills on the point. These hills are higher here than upon the coast to the S.S.E., and those on the point may be seen in clear weather at 8 or 10 miles.

Passes de l'Embouchure de la Somme.—The whole space included between the shores of the estuary just described is nearly entirely filled with an immense mass of sand which the sea leaves dry, and which extends into the offing as far as $1\frac{1}{2}$ miles outside a line drawn from Cayeux point to St. Quentin point. The surface of this sand is subject to

the sport of the winds and the tides, every day furrowed afresh by the streams, and the sand being shifting is formed into banks, the shape and height of which are extremely variable. The banks at the entrance, taken as a whole, from the parallel of Cayeux to that of St. Quentin point form a slope, the inclination of which is gradual seaward, but steep towards the land; their highest parts extend from N.W. of Cayeux lighthouse to North of Hourdel point, and are not covered at the lowest neaps.

None but fishing-boats or small coasters piloted by the mariners of the place, can enter the Somme by the narrow winding channel under St. Quentin point.

The principal entrance into the Somme lies amongst the southern part of the banks, abreast of Cayeux and the lighthouse. It consists of two narrow channels, each 2 miles long, separated from each other by a bank, some parts of which uncover 11 or 12 feet at the lowest tides. The northern channel runs in a N.W. and the southern channel in a S.W. direction from Cayeux lighthouse. They do not dry throughout, but the entrance of each is barred by a bank, which uncovers 3 feet, and on which ordinary springs rise about 28 feet, great springs 31 feet, and neaps 18 or 19 feet.

Buoys.—Black and red buoys mark both of the above channels, and to facilitate finding them a large vertical striped white and red bell buoy is moored outside the banks, within the depth of 5 fathoms, with Cayeux lighthouse bearing E. by S., Cayeux church tower, S.E. $\frac{1}{4}$ E., the middle of the valley of the town of Ault S. by W. $\frac{1}{4}$ W., the buoy at the entrance of the north-west channel E. by N. $\frac{1}{4}$ N. nearly 2 miles, and that at the entrance of the south-west channel, E.S.E. $1\frac{1}{2}$ miles.

The red and white bell buoy may be seen from a great distance, and should always be sighted when approaching the banks; when near it Lemot windmill will be open about a degree to the southward of Cayeux church, and the eastern end of the Grange wood, 1874, above Tréport, will be about the same distance open to the westward of Mers cliff, S.W. $\frac{1}{4}$ S. The buoys which mark the direction of the channels are liable to drive, but the greatest care is taken to keep them in fixed positions.

Chenal de la Somme.—The two narrow channels just described, when north of the lighthouse, unite and form one channel, 2 cables wide, which follows the direction of the shore as far as Napoléon guard-house, three-quarters of a mile westward of Hourdel point, and is called, in consequence of its unchanging nature, the Somme or entrance channel. This channel dries in some places at low water, and in other parts the soundings are very irregular.

At 3 hours flood the stream in the Somme channel runs 6 or 7 knots

at springs; but beyond the guard-house the channel widens, and the stream in some degree loses its strength.

Inner Channels.—The approaches to Hourdel point are encumbered by banks of shifting sand, the greater part of which do not cover till $2\frac{1}{2}$ hours flood. From this cause the rapid stream that enters the Somme channel till this hour of tide, continues to run to the north-east between these banks and the eastern edge of the high bank barring the mouth of the Somme, and does not run to the eastward until it is forced in that direction by the stream which enters from the north-west, and by the beach on the northern shore of the estuary. The stream then follows the course of this beach until abreast Le Crotoy, when the banks turn it to the south-east, towards St. Valery.

When the banks around Hourdel point are covered, the floods find a passage along the southern shore of the estuary, and its speed slackens considerably. The channel formed by the tide along this shore is sinuous, uneven, extremely variable, and less deep than that leading to Le Crotoy, which it is separated from by shifting sands. Both these channels are well marked with beacons and buoys, but they should never be attempted without a pilot.

Directions.—Vessels arriving off the mouth of the Somme with westerly winds, before there is sufficient water for them to pass through either of the outer channels, should keep a position on the meridian of Mers cliff, and to the S.W. of Cayeux Church tower; or, if the weather will permit, they may anchor in about $7\frac{1}{2}$ fathoms, good holding ground, on the meridian of the cliff, and W. by N. of Cayeux; with off-shore winds they can anchor to the westward of the large red and white bell buoy, moored outside the banks. When the narrows are practicable, a red flag is hoisted on a staff, close to the north-west of the lighthouse, at 4 hours flood. With off-shore winds the flag is hauled down as soon as the ebb commences, but with westerly winds it is kept flying three-quarters of an hour after high-water.

The banks bounding the outer channels are liable to such change that vessels which, in consequence of their tonnage, are subject to pilot dues, should never attempt to enter without pilots. But it sometimes happens that the state of the sea will not admit of pilots going out to vessels requiring them, or to the assistance of those that may be embayed off the mouth of the Somme and are obliged to run in, which is always practicable towards high-water springs when the red flag has been seen, and the position of the buoys at the entrance of the channels well ascertained. To supply as far as possible the want of a pilot on board, a tall flagstaff has been erected N.E., half a mile from Cayeux lighthouse, upon the



CHAP. III.] EMOUCHURE DE LA SOMME.—PORT ST. VALERY. 121

mast of which a red flag is hoisted, and made to incline right and left to direct a vessel in the channels; if she has entered and is steering a proper course, the flagstaff is kept in a vertical position, if not, it is drooped on the side towards which she should steer. These signals are made to vessels of all sizes when they have demanded a pilot.

PORT du HOURDEL.—Since the Hable d'Ault (noticed in page 116) has been closed up, the elbow the shore makes within Hourdel point served as a place of refuge for the Cayeux fishing boats, but the constant increase of the sands threatening to fill it up, a small harbour was made to shelter coasting craft. In 1841 the harbour consisted of a small dry basin, from 270 to 325 yards long and 76 wide. It has been much improved since, and now will contain about 30 vessels well secured. As the direction of the entrance is athwart the tidal streams, it would be imprudent to attempt to enter without a pilot, who can at all times board a vessel after she has passed through the outer channels.

LIGHT.—A *fixed* white tidal light, of the fourth order and visible 6 miles, is erected on Point du Hourdel, the south side of entrance. It is lighted till $2\frac{1}{2}$ hours before low water.

Fog Signal.—A bell is sounded in foggy weather.

Tides.—It is high water, full and change, on the beach at Cayeux, at 11h. 5m.; springs rise $27\frac{1}{4}$ feet, neaps 21 feet. Above the bottom of Hourdel harbour (which is 11 feet above the level of the lowest tides) equinoctial springs rise 22 to 23 feet; ordinary springs, 20 to 21 feet; neaps, about 10 feet. Strong winds from the westward cause the tide to rise a foot or two higher, and easterly winds have a contrary effect.

PORT de ST. VALERY-SUR-SOMME is, properly speaking, the continuation of the Somme canal outside the lock. An earthen embankment, 1,100 yards long, which begins at the lock and terminates in an open stockade 70 yards long, shelters it from north to east, and it is bounded on the west and south by the shore of La Ferté suburb, a part of which, 438 yards long, has been converted into a quay. The population of St. Valery in 1871 was 3,700. The exports are chalk, vegetables, sand, and ballast; and the imports, wood, coal, pig iron, wheat, cheese, flax, sulphur, wool, and linseed.

This harbour is quite sheltered from both winds and sea, and will contain from 30 to 35 vessels lying against the quays, or 60 or 70 when placed in a double tier, and they ground every tide upon a bottom of chalky mud mixed with sand and some shingle. A regular depth is maintained in the harbour now that the water collected in the canal is used for scouring.

LIGHTS.—A *fixed red* light of the fourth order 25 feet high and visible 3 miles, is exhibited from the extremity of the towing bank in front of St. Harold's tower, St. Valery.

A *fixed green* light, elevated 25 feet above high water is exhibited from the Mole head of the harbour of St. Valery, and should be visible in clear weather from a distance of 4 miles.

Tides.—It is high water, full and change, in St. Valery harbour, at 10h. 46m.; springs rise 27 feet; neaps $21\frac{1}{2}$ feet. Above the level of the berths in the harbour (which dry $13\frac{1}{2}$ feet above the level of the lowest tides,) equinoctial springs rise 20 to 21 feet; ordinary springs 17 to 18 feet; and neaps about 8 feet. Westerly winds raise the tide a foot or two higher, and easterly winds have a contrary effect. The tide begins to rise in the harbour about 3 hours after the commencement of the flood on Cayeux beach, and it fills in about $2\frac{1}{2}$ hours; at 4 hours ebb it is quite dry.

CANAL de la SOMME, formed on the left bank of the river, commences at the village of Sur-Somme, 2 miles below Abbeville, and is terminated at the bottom of St. Valery harbour by a lock, 656 feet long and 98 feet wide, in which vessels, ascending to or descending from Abbeville, are kept afloat. The mean depth of water maintained in the canal is 7 ft. 4 in. above the sills of the lock, which are 16 feet above the level of the lowest tides, and 3 ft. 3 in. above the level of the grounding berths at the foot of the quay in the harbour. The water is allowed to accumulate in the canal for three days, counting from the day after full and change, in order to permit vessels of 11 feet draught to pass through it.

PORT d'ABBEVILLE, formed in the western part of the town of Abbeville, extends 600 yards along the right bank of the Somme, from the ramparts to the bridge which unites the Hocquet and the Marcadet quarters of the town. A quay extends the whole length of the port, and it is said that the river is sufficiently deep along the quay to admit of vessels drawing 12 feet to remain afloat.

PORT du CROTOY.—The embankment which shelters the low shore of the mouth of the Somme, to the eastward of Le Crotoy, from the invasion of the sea, forms an elbow under the eastern part of that town, at the bottom of which a channel conducts the waters from the pond at Rue and the Favières marshes into the Somme. The current from this channel has formed a creek in the mud, in which fishing boats take shelter.

Le Crotoy occupies an advantageous position as far as relates to the circuitous course the flood stream makes in the mouth of the Somme during the time it has most strength. This stream clears out the channel

in front of Le Crotoy and renders it almost always deeper than the others.

LIGHT.—A *fixed* white light, of the fourth order, and visible 6 miles, points out at night the position of port Crotoy. It is lighted on a rising tide as soon as there are 3 feet water at the entrance, and extinguished 2 hours after high water.

Tides.—The bed of the creek at the inner part of port Crotoy, when free from the mud or sand sometimes deposited there, is $17\frac{1}{2}$ feet above the level of the lowest tides; and the tide rises on it 17 feet at equinoctial springs; 15 feet at ordinary springs; and about 4 feet at neaps; there is about a foot more water at the entrance of the port.

BANCS de SOMME.—The banks generally designated the Somme banks are, the Bassurelle de la Somme, the Quémer, the Battur, and the south-west part of the Bassure de Baas. Those dangerous banks lying in Dover strait, viz., the Varne, the Colbart, the Bassurelle, the Ridens, and the Vergoyer, have been described in Channel Pilot, Part I.

There is always sufficient water upon the Somme banks to admit of vessels crossing them, when bound for the mouth of the Somme. From the south-west end of the Bassure de Baas, the land can only be seen in fine weather, the eddies on these banks occasion a heavy sea when it blows hard; the soundings on them, however, differ sufficiently from those in the channels between them to enable the mariner to know his position with reference to the banks and the land. The Quémer and the Bassurelle de la Somme appear to be the lengthening out of that immense mass of sand and broken shells which forms the submarine slope along the shore from St. Valéry-en-Caux to the mouth of the river Canche.

The Somme banks are marked by two red bell buoys; the north buoy lies N. $\frac{1}{2}$ W. $3\frac{1}{2}$ miles from the church tower of Cayeux; and the south buoy N.W. by W. $\frac{1}{2}$ W. 2 miles from the same tower.

La Bassurelle de la Somme and **Le Quémer** spread towards the south-west, across the mouth of the Somme, and the latter bank ends about 11 miles N.W. by W., and the Bassurelle de la Somme 10 miles W. by N. $\frac{1}{2}$ N. of Cayeux lighthouse; the channel separating them has no opening to the north-east, but terminates in the depth of 7 fathoms about 5 miles W.N.W. of St. Quentin point. Neither of these banks are dangerous, but they are joined to the shore by a shoal bottom on which the depth is less than 5 fathoms at low water, and which extends nearly 5 miles into the offing. This shoal bottom terminates in two points projecting in the direction of each of the banks, the first as far as 6 miles W. $\frac{1}{2}$ S. from St. Quentin point, and the other $6\frac{1}{2}$ miles

W. by S. from Routhiauville point; the latter is the most dangerous, as there are only 18 feet water on it, 5 miles from the point on the same bearing.

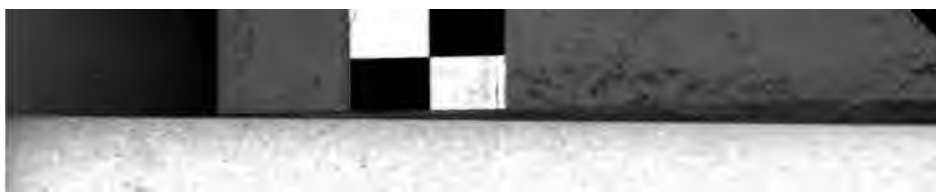
Le Battur lies in the channel separating the Quémer from the Bassure de Baas, and carries a depth from 6 to 8 fathoms. It is not dangerous to vessels of any draught, but the eddies on it cause a heavy sea when it blows hard. From its south extreme Cayeux lighthouse bears about S.E. $\frac{1}{2}$ S. 13 miles, and from its north end the lighthouse on Haut-Banc point, S.E. by E. $6\frac{1}{2}$ miles.

La Bassure de Baas is a narrow bank of sand and shells, 35 miles long, beginning at $3\frac{1}{2}$ miles to the south-west of cape Gris-Nez, and $1\frac{1}{2}$ miles from the shore abreast Ambletuse, and after following the direction of the coast as far as the mouth of the river Canche, it takes a south-west direction, and terminates about 18 miles from the shore a little to the southward of the parallel of the mouth of the river Authie, and 19 miles N.W. $\frac{1}{2}$ N. of Cayeux lighthouse. From its north end, as far as 4 miles to the southward of the Canche, it is dangerous at low water to vessels of large draught; its highest parts may indeed be touched upon by vessels of every description when there is any sea on at that time of tide.

The shoalest and the most dangerous spot on this bank is a small flat, half a mile long in a north and south direction, with only 12 feet on it. It lies nearly in the direction of the Colonne de la Grande-Armée (known as Buonaparte column, which stands three quarters of a mile to the northward of Boulogne), in line with Heurt fort, bearing E.N.E., and from it that fort bears N.E. by E. $\frac{3}{4}$ by E., cape Alprech lighthouse E. by N. $\frac{1}{4}$ N., Gravois windmill E. by S. and the summit of Mont St. Frieux S. by E. $\frac{3}{4}$ E.; the sea breaks with great violence on the whole of the flat during strong westerly winds.

For 14 miles to the southward of this flat, as far as West 8 miles from Touquet point, the shoalest parts of the Bassure de Baas form a succession of long narrow flats, upon which the depths vary from 20 to 26 feet, and the sea breaks heavily upon them when it blows hard from the westward. There are no dangers in the channel between the bank and the shore, but a high sea runs, when it blows strong on a weather tide, on some shoal spots, carrying from 6 to 8 fathoms, and lying nearly in the middle of the channel. During bad weather, with winds between West and N.N.W., the sea is less disturbed in this channel than outside the Bassure de Baas, particularly from the mouth of the Canche to cape Alprech.

Directions.—As the eastern side of the Bassure de Baas is steep to, the lead will be an uncertain guide to avoid the 12-feet patch, on its northern part, when running in the channel between the bank and the



shore ; but a vessel will keep in mid-channel, when between the parallels of Gravois windmill and the guard-house which stands upon the hills a quarter of a mile north of Brône rivulet, by steering with Crêche point opening and shutting with Heurt fort.

Great attention should be paid to the lead when approaching the channel between the Bassure de Baas and the Vergoyer from the northward, for the northern part of the latter shoal presents a steep projecting point at the outer edge of the 20-fathom line of soundings approaching the French coast. A vessel running from the southward through this channel, which is 5 miles wide and carries a depth of from 14 to 23 fathoms, will avoid the Vergoyer by keeping in 15 to 16 fathoms at low water throughout the whole length of the channel, allowing for the rise and fall of the tide.

Caution.—From St. Quentin point the coast which is low and bordered by ranges of sand hills, trends N.E. by N. 5 miles to Routhiauville point, the southern point of the mouth of the river Authie, and the only objects rising above the sand hills and visible in clear weather, are the tall spire of St. Quentin church and the windmill at Royons. The intermediate shore is fronted by a beach which dries $1\frac{1}{2}$ miles in a S.W. direction from St. Quentin, and W.S.W., one mile from Routhiauville points, between which the beach is only half a mile wide. Great caution is necessary not to be caught on this part of the coast with strong westerly winds, for they cause a high sea upon the shoal bottom extending 5 miles from the shore, and increase the speed of the flood, which in calm weather runs 3 knots. The same winds also decrease the rate of the ebb, and no dependence can be reckoned upon the strength of this stream to assist in clawing off the coast.

EMBOUCHURE de l'AUTHIE is comprised between Routhiauville and Haut-Banc points, which bear N. by E. $\frac{1}{2}$ E. and S. by W. $\frac{1}{2}$ W. from each other, distant $2\frac{1}{2}$ miles. The entrance is filled with an enormous accumulation of sand and broken shells, which dries at half tide, and at low-water springs uncovers $1\frac{1}{2}$ miles westward of the meridian of the latter point. Routhiauville point is covered with sand hills, and the only remarkable object near it is a guard-house standing amongst the highest hills at about 2 cables to the southward of the point. A sand bank, barely covered at high-water neaps, joins this point and extends in a circuit of more than a mile between the bearings of N.N.W. and N.E. from the guard-house. A similar bank surrounds Haut-Banc point ; and projects a mile between the bearings of W.S.W. and S.S.E. from the point, where it joins the shore.

The channel into the Authie is principally kept up by the flood stream

which sets in with great rapidity until the banks are covered. The entrance to this channel lies between the banks just described, and runs in an easterly direction from the outer edge of the sands as far as the northern bank of the river, at one mile to the S.S.E. of Haut-Banc point; it then, after rounding the north-east extreme of the said sand-bank joining Routhiauville point, subdivides into several branches, the principal of which turns to the southward, and terminates near the south bank of the river about a mile to the eastward of the guard-house on Routhiauville point. The tide rises in this latter part of the channel about 15 feet at springs, and the fishermen say that in case of emergency a vessel of about 9 or 10 feet draught could be placed there in safety; it is the only spot where the sea is tolerably smooth with westerly winds, for the waves are broken by the high bank to the westward of it, and the swell only reaches it during a short time before and after high water.

LIGHT.—Haut-Banc point may be easily recognised by day by its circular white lighthouse and guard-house standing near it on the sand-hills, which are sufficiently high to be seen in clear weather 7 or 8 miles distant. The lighthouse exhibits, at 115 feet above high water a *fixed* white light varied by a *flash every six seconds*, and visible from a distance of 14 miles; it is not visible in the direction of N. $\frac{1}{4}$ E., and in an angle of $10^{\circ} 30'$ towards the clock of the Hospital, and also disappears on approaching all dangers on the coast. The light is erected principally for the purpose of pointing out at night to the fishermen of Berck the position of the beach where they usually haul up their boats.

A Life Boat is stationed near the lighthouse.

Directions.—The mouth of the river Authie is dangerous to approach, especially with westerly winds, on account of the flood stream which runs into it with great rapidity, and might draw a vessel upon the banks where she would become a total wreck. The channel is marked by beacons for the use of small fishing vessels of about 5 feet draught belonging to the inhabitants of Groffliers, but they are not sufficient guides for a vessel seeking to enter, however small her draught. None should, indeed, attempt the entrance, unless under charge of one of the fishermen of Berck or of Groffliers, who alone are in a position to ascertain the changes which may take place in the channel.

The COAST from Haut-Banc point trends N.N.E. $\frac{1}{2}$ E. 8 miles to Touquet point at the entrance of the river Canche. The shore is low and sandy, and bordered by a range of sand-hills of moderate height. A sandy beach, half a mile wide, uncovers at the foot of the sand-hills, and joins the accumulation of sand which obstructs the entrance of the rivers Authie and Canche. The low plain adjoining the shore extends to the

foot of the hills, 3 or 4 miles inland, and is divided in its length into nearly two equal parts by a chain of sand-hills much higher than those bordering the beach, and which may be seen 8 or 9 miles distant. This chain of hills may be confounded with those bordering the beach, although they are distant $1\frac{1}{2}$ or 2 miles to the eastward, and it is important that this mistake should not occur when turning to windward along the coast in thick weather; for in standing in-shore a vessel might ground upon the beach, when the consequences may be serious should the sea be running high.

The objects which serve to recognise this part of the coast are the windmills of Verton and St. Jossee, standing upon the hills in the interior; the chain of sand-hills just described; the light tower on Haut-Banc point, and on Touquet point; the five guard-houses standing at equal distances on the sand-hills along the coast, and the church tower and windmills at Berck-sur-mer. This latter tower is built on the plain E. by N. $1\frac{1}{2}$ miles from Haut-Banc point, and is an excellent landmark; at a distance it resembles a large sloop under sail.

The inhabitants of Berck, Cuque, and Merlimont, fit out about fifty fishing boats of 2 to 9 tons burden, which they ground without fear at high water, upon that part of the beach lying close to the northward of Haut-Banc point.

EMBOUCHURE de la CANCHE, called by the local mariners the bay of Étaples, is 2 miles wide between Touquet and Lornel points, the north and south limits of the entrance, and runs 3 miles inland to the S.S.E. Like the estuaries of the Somme and the Authie, it is filled up with a mass of sand and broken shells, which is left dry at half ebb, and uncovers at low water as far as $1\frac{1}{2}$ miles outside the entrance. The entrance points and the shores of the river are formed of sand-hills of moderate height, the shapes of which are frequently changed by westerly gales.

From Touquet point, the south shore of the estuary trends in a S.E. by S. direction as far as abreast of the small fishing and commercial harbour of Étaples, which can only admit vessels of small draught, and consists of grounding berths on muddy sand, lying between the passage channel and the shore on the north-west side of the town, and where piles have been driven for mooring vessels. None but those drawing at the utmost 9 feet water can get up to this harbour at the springs, and then they must be conducted by pilots, for if they ground upon the sides of the channel they run the risk of either breaking their backs or upsetting. The north shore is low and winding, between Étaples and Lornel point its general trend is N.N.W.; the two shores converge towards each other, and the river abreast the town is only one quarter of a mile wide.

The surf and westerly winds carry towards the mouth of the Canche the sand of the beach south of Touquet point, and heap it up around that point where it forms a bank, the top of which is barely covered at neaps, and which extends in the circuit of nearly a mile between the bearings of N.N.W. and N.N.E. from the point. A similar bank is formed in front of Lornel point, extending a mile in a W.S.W. direction from it, and it is between these banks that the entrance channel is found which leads into the river. This channel is maintained by the alternate streams of flood and ebb, which are very rapid during the whole time the banks remains uncovered, but the rate does not exceed 3 knots the last hour of the flood and the first hour of the ebb. During westerly gales the sea is high at the entrance, and the waves caused by a strong S.W. wind cross it obliquely.

The entrance channel, from the outer edge of the banks, runs in an easterly direction as far as the northern point of the bank joining Touquet point, at about 3 cables from the north shore of the river; and thence it subdivides into several branches, the principal of which, forming the inner channel, runs to the southward along the eastern edge of the bank; then after following the south shore for 6 cables, it crosses over and follows the north shore as far as Étaples, where it unites with the course of the Canche, which, by means of two strong breakwaters, projecting from the southern shore, has been made to pass in front of the houses of that town.

Buoys.—The entrance of the channel into the Canche, from the outer part of the banks, is pointed out by a red bell buoy moored off it, and from thence the channel up to Étaples is well marked by red and black buoys and poles. The positions of the buoys are changed as often as the channel undergoes any variation, which frequently occurs.

LIGHTS.—Two lighthouses, 273 yards apart, bearing N. by E. $\frac{1}{4}$ E. and S. by W. $\frac{1}{4}$ W. of each other, are erected on Touquet point, to mark the position of the dangerous coast on which they stand; they each exhibit a *fixed* white light, dioptric and of the first order, at 174 feet above high water and are visible in clear weather 20 miles. Two lights are also shown from lighthouses erected on the sand-hills of Carniers. The upper lighthouse is built of iron and painted white, and exhibits from an elevation of 121 feet above high water a *fixed* white light, which is visible 10 miles in clear weather. The lower light is shown from a white square stone tower, and exhibits from an elevation of 54 feet above high water a *fixed red* light. It bears West, southerly, distant 800 yards from the upper light, and is only visible within an arc of 15 degrees on either side of the



line of direction; it is only lighted when there is a depth of at least 6½ feet water in the channel. It is visible 9 miles in clear weather.

Directions.—At night the heavy sea and the sand-banks at the mouth of the river Canche will be avoided by keeping cape Gris-Nez light will open to the westward of cape Alprech light. By day the extremity of cape Gris-Nez should be kept about half a point open to the westward of cape Alprech.

Vessels of more than 10 feet draught should never attempt to enter the mouth of the Canche without a pilot, or some person of local experience, unless they are driven into it by bad weather, or find themselves embayed amongst the sand-banks. The pilots reside at Étaples, and as it is impossible for them to board vessels outside when it blows hard from the westward they meet them under shelter of the bank joining Touquet point.

Small vessels without pilots, seeking shelter, should endeavour as soon as possible to get sight of the outer red bell buoy, and it is important not to pass to the northward of the parallel of Touquet point before it is sighted, for if they are set to the northward by the flood stream, which continues at its greatest strength outside the banks at the time of high water at Étaples, it would be impossible to regain the entrance.

The most favourable moment for entering the Canche is about one hour before high water, for the stream then runs into the channel with sufficient strength to assist a vessel in threading the channel, and the water will rise enough to float her should she take the ground after passing the *red* buoy. Pass between the black and red buoys, leaving the first to port and the latter to starboard. The pilots place vessels, drawing from 10 to 11 feet water, at the springs in the elbow which the channel forms between the three first poles from E.N.E. to E.S.E. of Touquet point, and they lie here in safety, even during westerly gales, protected by the high bank which joins Touquet point, and which dries from 21 to 23 feet above the level of the lowest tides.

Tides.—It is high water, full and change, in the mouth of the Canche at 11h. 20m., and the tide rises in the channel abreast the first pole (which stands N.E. 4 cables from Touquet point, and where the bottom dries 12 feet above the level of the lowest tides), from 17 to 18 feet at ordinary springs, 19 to 20 feet at equinoctial springs, and about 10 feet at neaps. At Étaples, springs rise from 9 to 14½ feet above the surface of the grounding berths, which dry 16 or 17 feet above the same level. The flood stream does not check the current of the Canche until about 3 hours after the tide has begun to rise upon the outer edge of the sand banks at the entrance.

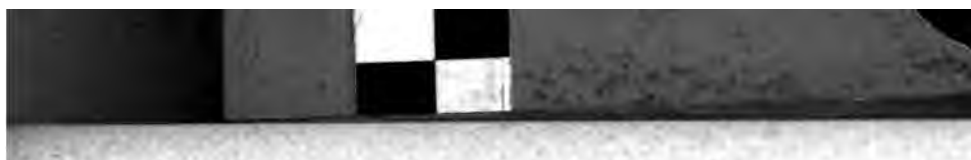


Caution.—The little elevation of the land, as well as the dangers bordering the shore, render the navigation of the coast for an extent of 25 miles from Cayeux to the mouth of the Canche, extremely dangerous in foggy or snowy weather, or during strong westerly gales accompanied by rain, when the weather is generally dark, the land covered with mist, and the most brilliant lights difficult to distinguish. To this may be added, that with these gales a few hours only suffice to raise a heavy sea in the eastern part of the Channel, and especially upon the edge of the great submarine slope which extends from the shore from St. Valéry-en-Caux to the river Canche, so that the influence of the waves alone is sufficient to cause a considerable drift. Besides this, when it is borne in mind that westerly gales tend to drive the water towards the bottom of the bight formed between capes Antifer and Gris-Nez, and greatly influence the direction of the tidal streams (noticed in page 141), it will be seen how important it is, that a vessel should not run into the eastern part of the Channel, until her position is well ascertained by bearings of cape Barfleur light, or of St. Catherine light on the south point of the Isle of Wight, and of using every precaution after these lights are lost sight of.

The only safeguard that can be recommended under these circumstances is the frequent use of the lead, and to keep in at least 20 fathoms water whatever be the time of tide; this will not only avoid the dangers near the shore, but also the banks lying between the mouth of the river Somme and Dover Channel.

The COAST from Lornel Point trends N. by E. $\frac{1}{2}$ E. $8\frac{1}{2}$ miles to cape Alprech, and thence N.E. by E. $2\frac{1}{4}$ miles to Boulogne. The shore, which is low and bordered by sand hills of moderate height, runs in a straight line from the mouth of the Canche to the Brône rivulet. This rivulet finds its way into the sea at 2 miles to the southward of the cape, and is the northern limit of the low sandy shore forming the coast during an extent of 34 miles from the town of Ault. At a mile to the northward of the rivulet the coast has but little elevation, and several houses of the village of Equihen may be seen on the slopes of the hills running down to the shore; but beyond this the coast is steep and formed of clay and schistose rocks of a dark grey colour.

The high land separating the courses of the rivers Canche and Liane extends to the westward to within $1\frac{1}{2}$ miles of the coast, and terminates near the meridian of Étaples in a chain of hills, many of which are of sufficient elevation to be seen in clear weather 25 miles distant. These hills are excellent landmarks for the pilots on this coast, who have given them the name of terres de Tourmont, or Tourmont land, and upon the highest are the windmill of Faux and of Houlette, which are visible at a



great distance; the former stands $2\frac{1}{2}$ miles to the north-east, and the latter 4 miles to the northward of Étaples.

At $1\frac{1}{2}$ miles from the coast and $2\frac{1}{2}$ miles to the northward of Houlette windmill, in front of the Tourmont land, is Mont St. Frieux, one of the most remarkable objects between the river Canche and Boulogne. It is composed of four mounds or hillocks, very near each other, rising from the same base and occupying a space of $1\frac{1}{2}$ miles north and south, and from its isolated position, as well as from the height of the hillocks, it may be seen in clear weather at the same distance as the Tourmont land.

Upon the highest of the hills north of Brône rivulet is the church of St. Étienne-au-Mont and the windmills of Gravois, Alprech, Portel, and Outreau, all of which may be seen a considerable distance at sea. The sandy beach, which extends the whole length of this part of the coast to near cape Alprech, uncovers at low water half a mile out from the foot of the sand hills, but north of Brône rivulet the shore is bordered by a shelf of irregular shaped rocks which dry a cable outside high-water mark.

CAPE d'ALPRECH is a perpendicular rocky cliff, of a brownish red colour, elevated 135 feet above the level of high water; the foot of the cliff is skirted by a shelf of rock covered with boulders which dries a cable out at low tide. From the cape the coast turns sharply to the north-east, and is high and steep to within four cables of the jetties at Boulogne.*

LIGHT.—A square lighthouse stands on the summit of cape Alprech, about 87 yards from the edge of the cliff, near the tower of the old semaphore, and S.W. $2\frac{1}{2}$ miles from the entrance to Boulogne. It exhibits, at an elevation of 161 feet above high water, a *fixed* white light, varied *every two minutes* by a *red flash*,† which is preceded and followed by a short eclipse. The light is dioptric and of the third order, and should be visible in clear weather from a distance of 10 miles.

PORTEL.—The coast between cape Alprech and Boulogne is intersected by valleys, and at the entrance of the largest is the village of Portel. This valley, situated 6 cables N.E. by E. of the cape, is enclosed by high land, and on the summit of the hill on its north side stands the fortress of Mont Couple, which, in 1857, was in a state of dilapidation.

The rocks which uncover at low water extend 4 cables into the offing from Portel, and upon their summit N. by E. $\frac{1}{4}$ E. about half a mile from

* See Admiralty chart:—North coast of France, sheet XIV., Boulogne to Dunkerque, No. 2,610; scale $m = 0.5$ of an inch.

† Attention to this *red flash* will prevent the light at cape Alprech for being mistaken for that at Beachy Head.

cape Alprech, is the small fort of Heurt. Sunken rocks, named the Lineur, project N.N.W. 2 cables from the fort, and a heavy sea runs upon them with a fresh S.W. wind; to pass to the westward or outside these rocks, do not bring the light-tower on the south-west jetty at Boulogne to the northward of E. by N. $\frac{1}{4}$ N.

The village of Portel is inhabited by fishermen, who ground their boats, about 40 in number, during the fine season on the south-west side of a small beach joining the shore in front of the village, where they are sheltered during the greater part of the tide by the surrounding rocks. When the weather is threatening, they are hauled above high-water mark, and placed in the bed of a small rivulet which runs in the valley; in winter they take shelter in Boulogne harbour.

PORT de BOULOGNE, occupying the entrance of the valley of the Liane, a small river the waters of which are abundant during the rainy season or at the melting of the snow, will admit vessels drawing 17 or 18 feet at ordinary springs, when the sea is smooth, 19 to 20 feet at equinoctial springs and about 13 feet at ordinary neaps. It consists of an entrance channel formed between two jetties, leading to a tidal harbour $3\frac{1}{2}$ cables long and a cable wide, which is partly bordered by stone quays and communicates on its west side with a semicircular basin about a cable wide. There is also a floating dock (which was opened in August 1868) containing a superficial area of 17 acres, with a quay 1,150 yards in length. The dock communicates with the harbour by a sluice 69 feet wide, having two pairs of gates, with a lock between them; the lock is 109 yards long, and its depth of water 29 feet at springs, and 23 feet at neaps. Sailing vessels should not attempt to enter during heavy westerly gales, and steamers run great risk, on account of the heavy sea then on the bar; and it should be remembered that during springs, when Boulogne is impracticable Calais can be entered, and the contrary. At the head of the harbour, and in the bed of the river, there is a reservoir of water for scouring the harbour and the entrance channel.

The general trade of the port is extensive. In 1868 the number of vessels entered inwards from foreign ports was 1,942, of 323,343 tons; and 1,967, of 325,386 tons, cleared outwards. The principal imports are coal, cast iron, steel, wool, machinery, flax and tow, cotton, &c.; and the exports, clocks, wine, grain, fruit and vegetables, Parisian articles, &c. &c. The herring and mackerel fisheries employ a considerable capital, and several vessels are fitted out for the Iceland cod fishery. The coasting trade is active, and there is constant communication by steamers with London, Hull, Dover, and Folkestone. The population of the town in 1869 was 40,251, of whom about one-fifth were English.

The town stands on the east side of the harbour, and is built in the form of an amphitheatre at the bottom and on the sides of a small valley enclosed between high hills. The buildings, which may be recognised at sea, are the bell-tower and the cupola of the new cathedral in the upper town, the church spire in the lower town, the marine baths, the windmill half-way up the hill to the south-east of the baths, and the new church of St. Pierre des Marins, on the top of the cliff.

Entrance Channel.—The two jetties enclosing the channel leading to the harbour are of unequal length, and run out on a sandy beach which the action of the sea has formed in front of the valley, and which uncovers half a mile out from the shore at the lowest tides. The channel is 4 cables long in a N.W. by N. and S.E. by S. direction, and 200 feet wide. The sand from the beach outside the jetties sometimes spreads itself across the entrance, and forms a sort of bar, rising 2 feet above the bottom of the channel (which with the beach is about 2 or 3 feet above the level of the lowest tides), but the bar is soon dispersed by the scouring water or by a sudden fresh of the river.

The south-west jetty is 735 yards long, and consists of a stone foundation, upon which is a wooden framework filled in and planked up to high-water mark, which shelters the channel from the high sea during S.W. gales. The north-east jetty, 547 yards long, runs parallel with the south-west jetty, and like it consists of a stone foundation surmounted by an open framework. In order that the scouring water may follow the course of the channel beyond the south-west jetty head, the north-east jetty has been extended by the addition of a low breakwater, 500 yards long, composed of rough stonework for 150 yards from the jetty head, and continued in strong stake work the remainder of its length. The position of this breakwater, the top of which is from 3 to 9 feet above the level of low water, is marked by two black buoys, one placed near its outer extremity at $1\frac{1}{2}$ cables from the outer end of the south-west jetty, and the other about half a cable farther in.

A red buoy with bell and reflector is moored in 16 feet water, one mile southward of Boulogne.

Harbour.—The north-east jetty is joined to the quays of Boulogne by a quay along which are placed the steam vessels that perform the daily service between France and England. The bottom at the foot of this quay rises $6\frac{1}{2}$ feet above the level of the lowest tides, or 4 feet above that of the entrance channel between the jetty heads; but it is hard and not fit for sharp laden vessels to ground upon for more than a few days. At high-water ordinary neaps, those drawing from 12 to 13 feet can be brought alongside the quay; vessels of larger draught lie aground there for four

or five days. There is a slip-way in the harbour for building or repairing small vessels, and a careening place along the quay, joining the slip.*

LIGHTS.—The time during which the entrance channel is practicable is made known at night by two vertical *fixed* white lights, of the fourth order, placed outside the tower (with a fog bell and cross jackyard on its summit), built upon the south-west jetty head; the upper light is 43 feet, and the lower light 33 feet above the level of high-water springs, and both lights may be seen in clear weather 9 miles. A *red* light, dioptric and of the fourth order, is exhibited from a white tower situated 33 yards from the north-east jetty head; it is 46 feet above the same level, and visible 7 miles.

The upper light on the south-west jetty is exhibited as soon as there are $9\frac{1}{2}$ feet water in the entrance channel, and the lower light at the time of high water; both lights are extinguished when the water falls to $9\frac{1}{2}$ feet.

A *fixed green* light is exhibited at an elevation of 33 feet, from a mast on the extremity of the north-east jetty. During the day a ball is exhibited.

The *green* and *red* lights in line show the direction of stone foundation, close to the north-east jetty.

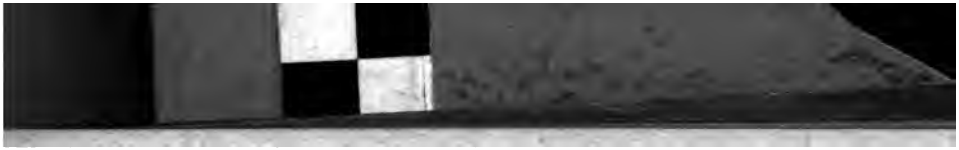
Pilots are unable to go out at Boulogne when the wind blows upon the coast and the sea is high at the entrance; but either a pilot or the lighthouse keeper directs, from the top of the lighthouse on the south-west jetty, the course to be steered by waving his hat. Should there be several vessels running for the harbour, the signal is for the vessel nearest the entrance. If the sea be too heavy to enter the channel, they should bear up for Calais, for, as before stated, when Boulogne harbour is impracticable on account of the high sea, that of Calais can be entered, and the contrary.

Life Boats.—There are three life boats stationed near the marine baths at Boulogne, furnished with every requisite for assisting vessels in danger, and several watchmen are constantly on duty.

RADE de BOULOGNE.—Good anchorage will be found in about $4\frac{1}{2}$ fathoms at low water, about three-quarters of a mile outside the pier heads at Boulogne, on a narrow strip of hard clay about 7 cables long, in a north and south direction, and a cable broad. This bottom is bounded on its west side by the rocky bottom called *l'huitrière* or oyster bed, which begins at cape Alprech and extends without interruption to the northward as far as the parallel of Ambleteuse.

The best anchorage, over good holding ground, is between the lines on which the colonnade of the new cathedral is seen in one with the guard-house of Châtillon battery, which stands on the sand-hills a little

* New harbour in course of construction, 1881.



to the southward of the south-west jetty; the fort on Mont Lambert in line with the belfry tower in the upper town; and S.W. $\frac{1}{2}$ S. from the small fort at Ambleteuse. Vessels of moderate draught waiting tide for several days to enter Boulogne may remain at this anchorage during moderate winds, and even if caught there by a strong westerly wind, if they ride with a long scope of cable out; those of large draught would be in danger of striking the bottom at low water.

Vessels arriving off the harbour some time before high water can anchor in the southern part of the road, with the column of the Grande-Armée in line with the light-tower on the south-west jetty, and Heurt fort open about a degree to the westward of the slope of the cliff at cape Alprech.

Directions.—The principal objects recognised when approaching Boulogne are, Mont St. Frieux (noticed in page 131), Mont Lambert, $1\frac{1}{2}$ miles to the eastward, and the column of the Grande-Armée a mile to the northward of the town. The entrance to the harbour bears N.W. $\frac{1}{2}$ W. from the summit of Mont Lambert, and W. $\frac{1}{2}$ S. from the column; the former is 1,903 feet, and the head of the statue on the column 1,469 feet above the level of low water.

From the Westward.—Vessels approaching Boulogne from the westward, with the wind between South and West, should take the channel between the Bassure de Baas and the Vergoyer banks, and if they arrive at the time of low water on the parallel of Mont St. Frieux, short tacks should be made in the channel between that parallel and the line on which the column of the Grande-Armée is in line with the light-tower on the south-west jetty. If the wind is between South and East, the channel between the Bassure de Baas and the shore should be taken, and short boards made to the southward of the line of the column and the light-tower in line, until the tide has risen; or if the weather will permit they can anchor in Boulogne road.

Vessels of the largest draught may at all times cross over that part of the Bassure de Baas fronting Boulogne. One of the deepest spots lies with the column of the Grande-Armée in line with the light-tower on the south-west jetty bearing E. $\frac{3}{4}$ N.

From the Northward.—With the wind between North and West vessels bound to Boulogne from the northward should pass to the westward of the Bassure de Baas, and if the wind is fresh they can wait outside this bank until the time is favourable for entering; but with a light wind the bank should be crossed on the parallel of Crèche fort, and a position maintained a short distance to the windward of the entrance. If the wind is between North and East, it will be better to take the channel between the Bassure de Baas and the land, and anchor, if the weather



permit, in a position so as to have the wind a point or two free for running into the entrance. The high land in the vicinity of Boulogne modifies the direction of the wind in the harbour, and sometimes when it is S.S.W. outside it is South or S.S.E. within. Strong winds from the N.E. come off in violent squalls from the land to the northward of the harbour.

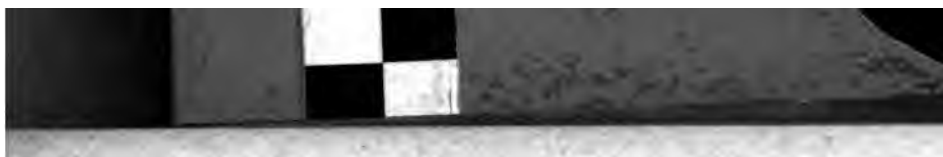
A vessel should endeavour to enter the harbour during the last hour of the flood, which will assist her being tracked in. With a fresh leading wind, she may be able to stem the first hour of the ebb, and even the freshes of the river Liane, and get up to the berths at the stockade if she has a sufficient number of haulers to track her in. But whatever may be the strength and direction of the wind, all possible sail should be carried on entering the channel, to stem the eddy which runs between the jetty heads as soon as the flood stream outside has attained its greatest strength, which is near the time of high water in the harbour. This eddy, after doubling the north-east jetty head, divides into two parts, one part entering the channel, and the other crossing it rapidly towards the south-west jetty head; it must be guarded against when the wind is light, and when it blows out of the harbour a boat should be sent for the tracking rope. Generally speaking, when the wind is between West, round southerly, and N.E., steer close to the south-west jetty head; with a fresh wind from the opposite quarter, keep in mid-channel; and in light winds steer for the south-west jetty to take in the tracking rope.

Should the vessel with a strong West wind miss the entrance, and there be no hope of clawing off the land, endeavour to pass close round the north side of the north-east jetty, so as to run her ashore close to the jetty. If this occurs at half or three-quarters of an hour after high-water, there will be some chance of getting her afloat again, but at all events the crew will be saved.

Anchorage.—Vessels arriving off Boulogne during the neaps and unable from their draught to go in, may, if the weather be fine, anchor in about 10 fathoms over good holding ground, at the eastern edge of the Bassure de Baas, abreast Vimereaux. Should they be surprised here by strong N.E. winds, they can make for Ambleteuse road, or if a S.W. gale should oblige them to seek for refuge, they can either run for the Downs or take shelter to leeward of the coast in the neighbourhood of Calais.

Tides and Tidal Signals.*—It is high water, full and change, in port Boulogne at 11h. 25., springs rise 25 feet; neaps 19½ feet and the tide rises above the berths at the foot of the steam-vessel quay, (which are 4 feet above the bottom of the entrance channel between the jetty heads, or 6½ feet above the level of the lowest tides,) 21 feet at

* For day tidal signals, see page 3, and for night tidal signals, see page 134.



CHAP. III.] RADE DE BOULOGNE.—TIDES AND TIDAL SIGNALS. 137

ordinary springs; 28 feet at great springs, and $12\frac{1}{2}$ feet at the lowest neaps; at ordinary neaps vessels of about 18 feet draught can be brought to the berths.

Strong westerly winds raise the tide a foot or two higher, and those from the eastward have a contrary effect, but no greater rise than that given above should be allowed, as sometimes it will be necessary to cross a bar at the entrance. An allowance must also be made for the scend of the sea, which runs high at the entrance when it blows fresh from the westward. The tide is slack at high-water springs for about 20 minutes with westerly, and 15 minutes with easterly winds, and vessels can be moved in the harbour during one hour and a half; at neaps the slack continues about 40 minutes.

At 3 miles to the westward of Boulogne, outside the Bassure de Baas, the flood stream begins to acquire its greatest strength at the time of high water in the harbour, maintains it for about 2 hours, and ceases at $3\frac{1}{2}$ hours after high water. At a short distance outside the jetty heads its greatest strength is at the time of high water in the harbour, and it ceases at $2\frac{1}{2}$ hours after that period. The eddies occasioned on the flood by the great projection of the south-west jetty from the shore, are very strong as soon as the beach to the southward of the entrance is covered. These eddies extend into the bay to the northward of the north-east jetty, and about the time of high water in the harbour they form a counter-stream along the face of that jetty; this stream runs to the N.W. and after rounding the jetty head divides into two parts, one of which enters the channel, whilst the other crosses it rapidly towards the south-west jetty head.

The system of tidal signals, noticed in page 3, is used at this port.

ASPECT of COAST.—Crêche point, bearing N.N.E. $\frac{1}{2}$ E. $1\frac{1}{2}$ miles from the south-west jetty head at Boulogne, is, as well as the intermediate coast, high and steep, and forms the west extreme of a range of hills separating the valley of the Liane from that watered by the river Wimille, and on one of their highest points stands the column of the Grande-Armée. A cable N.W. of the steep cliff is the small fort of Crêche, built on the rocks at the foot of the point.

The coast continues steep for nearly a mile from Crêche point, but thence to Vimereux, it is bordered by high sand-hills. At three-quarters of a mile to the N.E. of Crêche fort, and a quarter of a mile from the shore, is a small semi circular fort named Croi tower, with two tiers of guns, built upon the rocks at 50 feet above the level of the beach.

From Vimereux to Oies point, which bears N.E. by N. 2 miles from Crêche point, the coast is steep, but thence to Audrecelles village, 2 miles further to the northward, it is bordered by sand-hills of middling

PORT d'AMBLETEUSE, the entrance to which is a mile to the northward of Oies point, is, like that of Vimereux, in a complete state of ruin, and could with difficulty offer a refuge to small coasters which have missed Boulogne and find it impossible to weather cape Gris-Nez through a sudden change of wind to the northward. The harbour, to which great improvements were made at the beginning of the present century, was formed at the mouth of the little river Selack. The ruins of a stone jetty head, and some piles in the north-west part of the harbour, still mark the outline of a basin in which the vessels of the flotilla were placed, but it is now filled with sand and mud, and there are only 4 feet water in at springs.

RADE d'AMBLETEUSE is comprised in the space between the Bassure de Baas and the coast, and extends from the parallel of Vimereux to that of Audrecelles. Vessels of large draught bound to the northern ports in the Channel, or to those of Calais or Dunkerque, await the spring tides in this road, if they arrive during the neaps with northerly winds, and it affords shelter in gales between N.E. round easterly, and South; the sea is, however, very heavy here when it blows strong on a weather tide.

Anchorage.—The best anchoring ground is from the parallel of Vimereux to the line on which the church towers of Ambleteuse and Bazinghen are in one, bearing E. $\frac{1}{4}$ N., and a little in-shore of the rocky ground limiting the anchorage off Boulogne to the westward, and continues to the northward as far as the parallel of Ambleteuse. Large vessels, by not anchoring to the eastward of the line of the small tower of La Renard, (which stands a mile to the south-east of Portel), in one with the light-tower on the south-west jetty at Boulogne, S. $\frac{1}{4}$ W., will be in a good position to weigh should it blow strong from the westward.

A good berth for a vessel of large draught is to the N.W. by W. of Vimereux, with Le Renard tower open about a quarter of a point to the westward of the light-tower on the south-west jetty, in about 8 fathoms over hard muddy clay; or in 9 fathoms over good holding ground of muddy sand, with the light-tower and Le Renard tower in line, and Bazinghen church tower open a little to the northward of the Ambleteuse fort, E. $\frac{1}{4}$ N. Large merchant vessels can anchor in 7 fathoms over hard sand and broken shells on the latter bearing, and the column of the Grande-Armée in line with Croi fort.

The space between the eastern edge of the Bassure de Baas and the rocky bottom which bounds the anchorage in Ambleteuse road is named the Parfondingue by the Boulogne pilots, who state that should ships of the largest draught require to remain several days in the road, they would place them in that part of the Parfondingue between the line on



which the column of the Grande-Armée is in one with the southern slope of Crèche point, and the line on which Bazingen tower is in one with Ambleteuse fort, and that here they would have sufficient room to weigh and round cape Gris-Nez if it came on to blow strong from the S.W.; or, if it shifted to the West or N.W. the crest of the bank would shelter them from the heavy sea. To ride out a gale they should be moored with open hawse to the westward, and their anchors laid out with a long scope of cable to the N.E. and S.W. in the direction of the flood and ebb streams.

Tides.—At equinoctial springs the rate of the flood stream is from $3\frac{1}{2}$ to 4 knots abreast Ambleteuse, and in ordinary weather this rate continues nearly $2\frac{1}{2}$ hours; the stream follows nearly the direction of the channel, and ends about $3\frac{1}{4}$ hours after the time of high water at Boulogne. The ebb is less rapid, continues longer, and ends $2\frac{1}{2}$ hours before high water. The winds have great influence on both streams.

CAPE GRIS-NEZ lies $8\frac{1}{2}$ miles to the northward of Boulogne, and from it cape Alprech bears S.S.W. $\frac{1}{4}$ W. $10\frac{1}{2}$ miles; Dungeness N.W. b.W. $\frac{3}{4}$ W. $23\frac{1}{2}$ miles; South Foreland N. $\frac{1}{2}$ W. $17\frac{1}{4}$ miles; and Beachy Head W. $\frac{3}{4}$ N. 50 miles. This cape, 167 feet high, is one of the most remarkable headlands on the northern coast of France, and is visible in clear weather at 14 or 15 miles; from it the coast changes its direction abruptly to the eastward, and the precipitous rocky cliff, in which it terminates, as well as the cliffs to the southward and to the eastward, are of a dark grey colour and take a purple tint when lighted up by the sun. A lighthouse is built on the south-west extreme of a small spot of level land crowning the cape, and some works of defence may be seen rising above the same level land, and a guard-house at its extremity near the crest of the cliff. Large masses of rock lie at the foot of the cape, and a rocky shelf partly covered with sand, dries at low water a quarter of a mile out from the cliffs; the cape should therefore be given a berth of at least 3 cables when rounding it at that time of tide.

An automatic (self-acting whistle) buoy, painted red and black in horizontal stripes, is moored about $2\frac{1}{2}$ miles S.W. $\frac{1}{2}$ S. of the cape.

LIGHT.—The lighthouse on cape Gris-Nez is erected a quarter of a mile to the southward of the cape, about 100 yards from the edge of the cliff, and exhibits, at an elevation of 226 feet above high water, a white revolving light, the eclipses of which succeed each other *every half minute*. The light is *electric*, of the first order, and visible in clear weather 22 miles; the eclipses are not total in ordinary weather within the distance of 12 miles. In shore a fainter light will be visible.

Note.—This light cannot be mistaken for the light at Calais, which is varied *every four minutes* by a *flash*, preceded and followed by short



eclipses; nor for that at cape Alprech, which is varied *every two minutes* by a *red flash*.

PAS de CALAIS.—The narrowest part of this channel is 9 miles wide between the Ridge or Colbart shoal and cape Gris-Nez; thence it runs parallel to the coast as far as Boulogne, and then in a W.S.W. direction between the Bassurelle and the Vergoyer. With easterly winds, it is to be preferred to Dover channel, between the Varne and the English shore; it is also wider and deeper, and forms what is called the continuation of the deep sounding channel in the North Sea, where the depth at low water is above 20 fathoms. It is easily navigated by the lead, either with a leading or beating wind, even during fog or snow, the only danger being the northern end of the Ridge, which rises abruptly from the depth of 20 fathoms.

A vessel turning to windward in the Pas de Calais, either by day or night, when north of the parallel of cape Gris-Nez, should, when standing to the westward, not bring the South Foreland lighthouses to the eastward of N. by E. $\frac{1}{2}$ E. to avoid the north end of the Ridge; and when south of that parallel, not go into less than 20 fathoms at low water.

Tides.—It is high water, full and change, on the beach a little to the eastward of cape Gris-Nez at 11h. 27m., ordinary springs rise $21\frac{1}{2}$ feet, great springs 27 feet, neaps $16\frac{3}{4}$ feet. Within a circuit of 2 miles around the cape the streams run stronger than at a greater distance from the shore; the flood beginning 2 hours before, and ending $3\frac{3}{4}$ hours after the time of high water at Boulogne, and running when at its greatest strength, 4 knots at ordinary springs. Between the Ridge and the shore the flood stream runs with much greater strength than the ebb.

The tidal streams in the northern part of the English Channel are of the same duration as in the bay of the Seine, the flood running about 5h. 40m., and the ebb 6h. 50m. Towards the middle of the Channel the streams run straight through its length, until they have attained their greatest strength, when they follow the bends of the coast to a distance of 7 miles in the offing. Within these limits, as soon as the flood stream begins to be felt, it turns towards the shore, but as its strength increases, it tends more to its principal direction, which is that which it follows when at its greatest strength, and which it retains for the greatest length of time; when its rate begins to decrease, it turns off-shore and takes different directions till the end of the tide. The ebb stream runs with less velocity and undergoes the same change, but with this difference, that it directs itself towards every point of the compass. The rate of both streams increases in proportion to the narrowing of the Channel, and in

the channels between the banks this rate is increased from half ebb to half flood.

Caution.—The deep elbow formed on the coast of France, between capes Antifer and Gris-Nez, constrains the flood stream in fine weather to change its course about the meridian of Ailly point and to turn to E. by N. in an oblique direction to the coast between the river Somme and the latter cape; but with strong westerly winds it runs much farther to the eastward and turns suddenly a short distance from the shore, causing a high sea. Vessels bound from the westward to the ports in the northern part of the Channel cannot be too attentive to the effects of this stream when they are running with a strong westerly wind, and as soon as they have made out either cape Barfleur light or that on St. Catherine point, they should proceed with great caution, to avoid being set over on the French coast, and sound frequently after passing the meridian of cape Antifer, for, if they take the ground upon any of the banks off the Somme or upon the shore of the low coast in its vicinity, it may involve the loss of the vessel and crew.



TABLE showing the Direction and Rate of the Tidal Streams, during ordinary Springs, from Cape Antifer to Cape Gris-Nez.

Positions.	Tidal Stream.	Time with reference to High Water at Dieppe.	Direction.	Rate.	Duration.
		h. m.		knots.	h.m.
N.N.W. 7 miles from Cape Antifer.	Flood . . .	2 20 before	E.N.E. . .	4'0	—
	End of flood . . .	0 40 after	—	—	—
	Ebb . . .	4 0 "	W. by N. . .	3'5	—
	End of ebb . . .	5 0 before	—	—	—
N.N.E. $\frac{1}{2}$ E. 34 $\frac{1}{2}$ miles from Cape Antifer.	Flood . . .	2 20 before	E. by S. . .	3'5	2 0
	End of flood . . .	1 0 after	—	—	—
	Ebb . . .	4 0 "	W. $\frac{1}{2}$ N. . .	3'2	2 30
	End of ebb . . .	5 20 before	—	—	—
N.E. by E. $\frac{1}{2}$ E. 18 miles from Cape Antifer.	Flood . . .	1 5 before	E. by S. $\frac{1}{2}$ S. . .	4'0	—
	End of flood . . .	1 45 after	—	—	—
	Ebb . . .	4 30 "	West . . .	3'5	—
	End of ebb . . .	5 0 before	—	—	—
N.W. by W. 2 $\frac{1}{2}$ miles from Dieppe	Flood . . .	2 40 before	E. by S. . .	3'0	3 0
	End of flood . . .	1 5 after	—	—	—
	Ebb . . .	4 0 "	W. by N. . .	2'9	—
	End of ebb . . .	4 50 before	—	—	—
N.N.W. 1 $\frac{1}{2}$ miles from Tréport	Flood . . .	2 20 before	E. $\frac{1}{2}$ S. . .	3'0	2 45
	End of flood . . .	1 20 after	—	—	—
	Ebb . . .	5 40 "	W. by N. . .	2'8	—
	End of ebb . . .	4 20 before	—	—	—
W. by N. 16 $\frac{1}{2}$ miles from Haut Banc point, on the S.W. end of the Bassure de Baas.	Flood . . .	2 40 before	E. by S. . .	2'0	—
	" . . .	0 40 "	E. by N. . .	3'0	—
	" . . .	1 20 after	N.E. by N. . .	1'6	—
	End of flood . . .	2 20 "	North . . .	0'5	—
	Ebb . . .	6 0 "	S.W. by W. . .	2'0	—
	" . . .	4 40 before	S.W. $\frac{1}{2}$ S. . .	2'7	—
N.W. by W. $\frac{1}{2}$ W. 5 miles from Haut Banc point.	Flood . . .	1 40 before	E.N.E. . .	1'6	—
	" . . .	0 30 after	N.E. by N. . .	3'5	2 0
	End of flood . . .	3 20 "	—	—	—
	Ebb . . .	5 10 before	S.W. by W. . .	3'0	—
	" . . .	4 0 "	S.W. . .	2'4	—
	End of ebb . . .	2 40 "	—	—	—
On the Bassurelle Bank	Flood . . .	2 20 before	N.E. by N. . .	1'5	—
	" . . .	0 30 "	E.N.E. . .	3'5	—
	" . . .	2 30 after	E. by N. . .	2'0	—
	End of flood . . .	4 0 "	—	—	—
	Ebb . . .	4 45 before	S. by W. . .	3'0	—
	" . . .	4 10 "	W.S.W. . .	3'0	—
N.W. by W. 2 $\frac{1}{2}$ miles from the entrance to Boulogne.	Flood . . .	1 10 after	N.E. by N. . .	3'0	2 0
	End of flood . . .	4 10 "	—	—	—
	Ebb . . .	4 40 before	S.W. by S. . .	2'6	—
	End of ebb . . .	2 0 "	—	—	—
On the south end of the Ridge shoal.	Flood . . .	0 10 before	N.E. by E. . .	2'5	—
	" . . .	1 0 after	N.E. by E. . .	3'8	—
	End of flood . . .	—	—	—	—
	Ebb . . .	5 10 before	W.S.W. . .	3'5	—
On the top of Varne shoal	Flood . . .	2 0 "	—	—	—
	" . . .	1 25 after	East . . .	4'0	2 50
	" . . .	3 5 "	E. by N. . .	2'8	—
	" . . .	4 0 "	E.S.E. . .	1'3	0 40
	End of flood . . .	5 5 "	S. by W. . .	0'6	—
	Ebb . . .	3 50 before	West . . .	3'5	—
End of ebb . . .	" . . .	2 15 "	W.S.W. . .	2'0	—
	" . . .	1 30 "	N.N.W. . .	0'4	—

CHAPTER IV.

CAPE GRIS-NEZ TO DUNKERQUE.

VARIATION IN 1882.

Cape Gris-Nez	-	-	-	-	17° 10' W.
Dunkerque	-	-	-	-	17° 0' W.

The COAST from cape Gris-Nez trends E. by N. $\frac{1}{2}$ N. 6 miles to cape Blanc-Nez, the intermediate land is high and may be seen in clear weather from 15 to 20 miles off; but beyond the latter cape the shore bends more to the eastward, the high land turns in a south-east direction towards the interior, and a level plain extends from its foot to the coast where it terminates in a low sandy shore bordered by ranges of sand-hills, the highest of which are visible only 7 to 10 miles off. Between the capes the shore forms a slight elbow, at the bottom of which is the village of Wissant, inhabited by fishermen. From about a mile to the eastward of cape Gris-Nez, where the cliffs of that cape terminate, to $1\frac{1}{2}$ miles to the north-east of Wissant, where the steep cliffs recommence, the coast is low and bordered by sand-hills.*

Cape Blanc-Nez owes its name to the high chalk cliff in which it terminates. It forms no marked projection, but its position may be recognized from a good distance at sea by the guard-house built on the summit of the steep mound which crowns it, and which is the northern extremity of a range of hills joining Mont Couple. The last slopes of the high land forming the cape, as well as the steep coast in which they terminate extend $1\frac{1}{2}$ miles to the eastward, nearly as far as the village of Sangatte, and at this village commences the low sandy shore, which forms the remaining part of the French coast. The sand-hills are low to within $1\frac{1}{2}$ miles of Sangatte, but they gradually rise in elevation as they approach Calais, spreading into several parallel ranges which approach within 2 or 3 cables of the shore.

The principal objects on this part of the coast are the windmills of Coquelles, which stand about 2 miles inland upon the last slopes of the

* See Admiralty charts :—Dover strait, No. 1,895; scale $m = 0.68$ of an inch : North sea, sheet 1, No. 1,046; scale, $m = 0.3$ of an inch : and north coast of France, sheet xiv., Boulogne to Dunkerque, No. 2,610; scale, $m = 0.5$ of an inch.



range of hills extending to the eastward of cape Blanc-Nez; the wind-mill at Bas or Nieulay, to the northward of these; the red buildings at Trouie or the Salines, situated about half-way between Sangatte and Calais, N.N.E. $\frac{1}{2}$ E. from Coquelles windmills, and are useful marks to the pilots, who call them *les maisons rouges* or the red houses; and the ramparts and citadel of Calais, which rise above the sand-hills, and may be seen a considerable distance at sea.

The beach in front of Sangatte is only a quarter of a mile wide at low water, but near the west jetty at Calais it drives out half a mile. Within a quarter of a mile of the beach there are several shoal patches of 7 and 7 feet, and no vessel should get amongst them at low tide.

Banc à la Ligne.—The great prominence of cape Gris-Nez, and the sudden change there in the direction of the coast occasions an extensive eddy to the north-east of it during the flood. This eddy has no doubt caused the formation of this bank of sand and broken shells, which extends E.N.E. 4 miles from the cape, and nearly 2 miles from the shore abreast Wissant. Its shoalest part uncovers at low-water springs, and towards its north east extreme several heaps of sand, named *La Barrière*, have been formed, upon the highest of which are only 4 to 9 feet water; the sea runs high upon them when it blows fresh on a weather tide. The south-west end of the bank appears to be gradually joining itself to the cape, there being only a depth of 4 feet in the channel at low water. The Barriere has a buoy moored one quarter of a mile north of the 4-feet patch.

Les Gardes.—The shore between cape Gris-Nez and Blanc-Nez is bordered by a sandy beach, uncovering in some places 4 cables out at low water. In front of all the steep parts of the coast there are rocks rising from the sand, and amongst them and farthest from the shore are those named the Gardes, which uncover 7 feet at the lowest tides; from their outer extreme Wissant church tower bears S.W. by S. 2 miles and the guard-house on cape Blanc-Nez E. by N. nearly $1\frac{1}{2}$ miles.

Les Quenocs and Le Rouge Riden.—A rocky bottom, joining the shore and partly covered with sand, extends from the Gardes to Sangatte village and 2 miles into the offing between the bearings of N.N.W. and E.N.E. of cape Blanc-Nez, and its shoalest part forms two distinct dangerous flats of irregular rocks.

The western flat, named the Quenocs, is about half a mile in diameter, and from its shoalest head of 7 feet the guard-house on cape Blanc-Nez bears S. by E. $\frac{1}{2}$ E. about $1\frac{1}{2}$ miles, and Sangatte church tower E. by S. $\frac{3}{4}$ S. $2\frac{1}{4}$ miles. A buoy is moored one-third of a mile to the northward of the 7-feet patch.

The second flat, named Rouge Riden, is nearer the shore, and nearly a mile in extent from W.S.W. to E.N.E.; from its shoalest head of 7 feet the above guard-house bears South one mile. A shoal head of 9 feet also lies

on the eastern edge of this flat, with the guard-house bearing S.S.W. $\frac{1}{2}$ W. $1\frac{1}{4}$ miles, and the church tower E.S.E. $1\frac{1}{2}$ miles. The sea runs high on both flats when blowing fresh on a weather tide. Sangatte church tower seen between the two windmills at Coquelles, bearing S.E. $\frac{1}{4}$ S., leads half a mile to the northward of the Rouge Riden.

Le Riden de Calais.—This bank, 4 miles long in a N.E. by E. and S.W. by W. direction, commences N. by E. $1\frac{1}{2}$ miles from Sangatte, and ends N. $\frac{1}{2}$ E. about $2\frac{1}{2}$ miles from the entrance to Calais. The general depth on it varies from 5 to 8 fathoms, with three heaps of sand towards its centre, upon the shoalest parts of which there are only 18 to 22 feet water; from the southern shoal head with 18 feet on it, the entrance to Calais bears S.E. by E. $\frac{1}{2}$ E. 3 miles. The Riden is dangerous at low water for vessels of large draught; it also occasions strong eddies, and during fresh northerly winds there is a heavy sea on it, and breakers in N.E. gales.

Two buoys mark this danger, viz., the S.W. buoy, black, with staff and diagonal cross, and marked No. 1, lies in 10 fathoms, with Calais lighthouse E.S.E., Sangatte church S. by E. $\frac{1}{2}$ E. $1\frac{1}{2}$ miles distant, and the southern patch of 18 feet on the Riden E. by N. $1\frac{1}{2}$ miles; and the N.E. buoy, red and marked No. 6, with staff and ball in 10 fathoms, with Walde lighthouse S.E. $\frac{1}{4}$ E., and Calais lighthouse S. $\frac{3}{4}$ W.

Les RIDENS de la RADE, also named the Têtes, lie N.N.W. one mile from Calais pier-heads, and when this coast was surveyed in 1836, they consisted of several heaps of sand, upon the highest of which were 4 fathoms at low water. Since that period they have been sensibly on the increase, and in 1857 there were only 2 fathoms over the highest head. Another head, with only $1\frac{1}{2}$ fathoms on it, and on which the fishing boats sometimes ground, lies about half a mile to the N.E. of the extremity of the east jetty. A heavy sea runs upon them when the wind blows upon the shore.*

RADE de CALAIS, comprised between the Riden de Calais and the beach to the westward of Calais harbour, affords anchorage with off-shore winds to vessels arriving off the harbour a few hours before the tide will permit them to enter. A convenient position, in about 9 fathoms water at one mile from the shore, with Sangatte church tower in line with the guard-house on cape Blanc-Nez, bearing W.S.W., and Calais lighthouse S.E. $\frac{1}{2}$ E. At night, keep cape Gris-Nez light opening and shutting with the cliffs at cape Blanc-Nez, and anchor when Calais light bears S.E. $\frac{1}{2}$ E. The road carries a depth of from 10 to 14 fathoms towards the Riden de Calais, and 7 to 9 fathoms at half a mile from the steep edge of the beach, over a sandy bottom mixed with broken shells; but the pilots say that the

* On the Admiralty plan of Calais, No. 2,556, published in 1882, on the authority of the most recent French Government survey, Les Ridens de la Rade do not appear.



anchors penetrate into a good holding ground beneath the sand, and that ships of the largest draught have rode out a N.W. gale without driving under the southern part of the Riden. The holding ground is not so good near the shore.

The road is sheltered by the land from W.S.W. round southerly, to S.E., but it is quite open to all other points of the compass. The Riden cannot be considered as a shelter, although the waves break with great violence during a northerly gale on its whole extent; the sea, however, is much quieter here than in the offing, and a vessel with good ground tackling might ride out a gale in the northern part of the road.

PORT de CALAIS.—This port, the entrance to which is between two wooden jetties, consists of a tidal harbour and a small basin named Paradis, which dries at low water; a floating basin under the ramparts of the citadel, in which the largest vessels that can enter the harbour lie afloat; and a reservoir containing the scouring water. The entrance lies $11\frac{1}{4}$ miles to the eastward of cape Gris-Nez; S.E. $21\frac{1}{2}$ miles from Dover, and S.E. $\frac{1}{2}$ S. 20 miles from the South Foreland. Vessels of about 20 feet draught can enter the harbour at high-water ordinary springs, in fine weather when the sea is smooth, and of 15 feet at ordinary neaps; but those seeking to enter during northerly winds, when the sea is not too high at the entrance, should not attempt it if they are above 17 feet at springs or above $12\frac{1}{2}$ feet at neaps. The average depth on the bar at the lowest tides is about 5 feet, and 7 to 8 feet at the neaps, but it varies with the wind.*

With W.S.W. gales, which render the navigation of the English Channel so dangerous, the tide will rise a foot or two higher; and it should be remembered that during springs, when it blows strong between West and South, and Boulogne is impracticable, Calais can be entered; on the contrary, when it blows hard between North and E.N.E., and it is impossible to enter Calais, Boulogne can be entered.

Calais has some foreign, and a brisk coasting trade, and the vessels belonging to the port are chiefly employed in the herring and mackerel fisheries. In 1869 the population was 12,727. The imports are salt, colza oil, fish, coal, cordage, rails, cast iron, wood, woollens, cottons, machinery, &c., &c.; the exports, wines, silks, Parisian goods, perfumery, &c., &c. The English and French mails cross the channel between Dover and Calais, the distance being accomplished, under ordinary circumstances, in $1\frac{1}{2}$ hours.

The entrance channel is about 263 feet wide, and runs 6 cables in a S.S.E. $\frac{1}{4}$ E. direction from the entrance, between jetties lengthened out 807 feet by open pilework, which is crossed, as well as that part of the channel it encloses, by the flood and ebb streams. This arrangement pre-

* See Admiralty plan of Calais, No. 2,556; scale $m = 5$ inches.

vents the sand from accumulating in front of the entrance, but it is a serious inconvenience to vessels entering or leaving at high water, as the stream outside is then running at its greatest strength.

The harbour begins where the east jetty joins the wall of the quay at the eastern part of the town. This wall continues along the whole length of the harbour, except where it is interrupted by the entrance to the Paradis basin, and by the sluice of the citadel ditch. The quays are spacious, their surface being 27 feet above low water. That part between the Paradis basin and the east jetty, named the Courgain of Colonne quay, is where vessels that arrive after high water, or those preparing to quit the harbour, are placed, and about one half of the quay between the entrance to this basin and the citadel sluice is reserved for the mail and passage steamers; the other half is given up to merchant vessels. There is a careening slip in the harbour, and a large crane, which may be used for masting.

The Floating basin has a surface of 20,000 square yards, with 590 yards extent of quays. The entrance between the gates is 54 feet wide, and their sill is 3 feet 2 inches above the lowest tides. Both the harbour and floating basin are well sheltered from wind and sea; a swell, however, runs into the entrance channel, the harbour, and the Paradis basin from half flood to half ebb when it blows strong from the northward, and vessels that are then alongside Colonne quay strike heavily upon a hard shingle bottom.

New docks are in progress; also a large reservoir on the sands east of Calais pier, which will be filled each tide and discharged at low water through a sluice situated near the pier head, in such a volume as it is calculated will wash away the bar outside and maintain a deep channel. (1878.)

Life Boats.—There is a life-preserving apparatus at Calais, and two life boats; one stationed on the east, the other on the west side of the harbour.

LIGHTS.—Calais Lighthouse, octagonal and 167 feet high, stands in one of the angles of the fortifications at the north-east side of the town, and exhibits, at 190 feet above high water, a *fixed* white light varied *every four minutes* by a bright *flash*, preceded and followed by short eclipses, which are not total in ordinary weather within 12 miles. The light is dioptric and of the first order, and visible in clear weather 20 miles.

East Jetty.—A *fixed* white light 39 feet high and visible 9 miles is exhibited from a turret at the extremity of the east jetty. This light is accompanied by two small *fixed red* lights to indicate the depth of water in the channel.



Tidal Signals.—The white light alone indicates a depth of 10 feet water throughout the whole length of the channel; a *red* light below the white indicates a depth of 13 feet; a *red* light above the white indicates a depth of $16\frac{1}{4}$ feet, and the three lights together a depth of $19\frac{1}{4}$ feet.

West Jetty.—A *fixed red* light, elevated 23 feet, is shown at the extremity of the west jetty, and is visible 4 miles distant; but it is essential to observe that during severe weather all access to this jetty head is sometimes cut off.

Fog Signal.—A bell is sounded in foggy weather from the turret on the East Jetty.

Directions.—As a general rule, cape Blanc-Nez should be sighted when bound either to Calais, Gravelines, or Dunkerque. The most favourable winds for entering Calais harbour are those from W.S.W., round northerly, to East. When those that blow upon the coast are moderate, they only cause a heavy swell on the beach, but strong winds send in a heavy sea, and it is then dangerous to enter. Under these circumstances, which are frequent in winter, vessels bound for the northern ports of France should immediately run for Boulogne.

Vessels running for Calais from the south-west should when on the parallel of and about a mile from cape Gris-Nez, steer about N.E. by E. $\frac{1}{2}$ E., taking care not to bring the extremity of the cape to the westward of S.W. by W. in order to keep outside the Barrière and the Quenocs rocks; when Sangatte church-tower is in line with the Coquelles windmills, bearing S.E. $\frac{1}{4}$ S. steer E.S.E. for the centre of Calais, until Audinghen church-tower is hid behind the cliff at cape Blanc-Nez, when, if there is water sufficient to enter the harbour, a course should be shaped for the entrance; if not, an anchorage should be sought for in the southern part of Calais road.

The largest vessels that the harbour will admit may pass at all times of tide between the Quenocs and the Barrière, by keeping Sangatte church-tower in line with either of the three towers of Calais; they may also pass between the Rouge Riden and the shore, from half flood to half ebb.

At Night cape Gris-Nez light should not be brought to the westward of S.W. by W. to avoid the Barrière and the Quenocs, and when Calais light bears E.S.E., steer E. by S.; then, if the ebb is running, anchor as soon as cape Gris-Nez light is about to be hid behind the cliff at cape Blanc-Nez.

From the Northward.—Vessels coming from the northward with a fresh fair wind, may, between a third flood and two-thirds ebb in Calais harbour, run either by day or night directly for the entrance over the

Riden de Calais, as there is sufficient depth on that shoal at the time of tide. If late on the ebb, run on the meridian of cape Blanc-Nez until Sangatte church-tower is in a line with the Coquelles windmills, S.E. $\frac{1}{4}$ S., then steer, if the weather be favourable, for the anchorage in the southern part of Calais road.

At Night steer for Calais light on an E.S.E. bearing, until Cape Gris-Nez light bears W.S.W., then steer E. $\frac{1}{2}$ S. until Cape Gris-Nez light is just hid behind cape Blanc-Nez, when anchor, if the ebb be running, or if the flood, steer for the harbour.

Entering the Harbour.—The most favourable time for entering Calais harbour, when the wind blows upon the coast, is at the moment of high water; but with the wind abeam or ahead, at half or three-quarters of an hour before that period, so as to have time to be tracked up to the quays, or into the floating basin. It should, however, be borne in mind that during calm weather, at half a mile outside the entrance, the flood stream continues to be felt $2\frac{1}{2}$ or 3 hours, and with strong westerly winds $4\frac{1}{2}$ and 5 hours after high water in the harbour, and it is at its greatest strength at the time of high water there. For this reason, whatever the direction of the wind, the end of the west jetty should be steered for, to avoid being set to the eastward of the entrance, and this precaution is particularly necessary when standing for the harbour on the starboard tack; the bower anchor and a stern anchor should then be ready for letting go, and hawsers to run out in the event of being drifted on the east jetty. All sail should be carried, especially with the wind right aft, to stem the flood and to pass quickly through the swell at the entrance. Should a vessel with a strong westerly wind and without a pilot miss the entrance, she must anchor immediately, as near as possible to the end of the east jetty, and take in a pilot, whose assistance will then be indispensable.

Vessels may get out of the harbour and gain an offing with a head wind, by making sail from the end of the west jetty on a weather tide.

Tides and Tidal Signals.*—It is high water, full and change, in Calais harbour at 11h. 49m.; springs rise $19\frac{1}{2}$ feet; neaps $15\frac{1}{2}$ feet above the water in the entrance channel, ordinary springs rise 20 feet, equinoctial springs 22 feet, and ordinary neaps 16 feet. The tides rise higher with strong winds from N.W. to W.S.W. than they do with those from East to S.S.E.

The depth of water at the quai de Marée alongside the east jetty is at high-water springs, 31 feet 2 inches; at low water, 10 feet 5 inches. At

* For day tidal signals, see page 3, and for night tidal signals see pp. 148 and 149.



quai Commerce, at high-water springs, 22 feet 5 inches; at low water, 1 foot 7 inches.

The mean duration of the flood stream at springs in front of the entrance is $5\frac{1}{2}$ hours, and of the ebb $7\frac{1}{4}$ hours. At half a mile outside the piers the flood runs $2\frac{1}{2}$ or 3 hours after high water in the harbour, and with strong westerly winds, $4\frac{1}{2}$ or 5 hours; with easterly winds it continues only $1\frac{1}{2}$ or 2 hours. The rate of the flood at great springs is $4\frac{1}{2}$ knots. The slack at high-water springs continues about 20 minutes, and large vessels can be moved in the harbour during the space of $1\frac{1}{2}$ hours; at neaps the time of slack often amounts to three-quarters of an hour.

The tidal signals are the same as those noticed in page 3, with this exception, that the flags are hoisted when there are 8 feet water at the jetty heads, instead of $6\frac{1}{2}$ feet, and lowered as soon as the water has fallen to that level.

BANKS off the NORTH COAST of FRANCE.—The approach to this low, dangerous coast is obstructed by numerous banks, composed of gray and black sand, which extend as far as 15 miles from the shore on the meridian of Calais, and 42 miles in a N.E. direction from Dunkerque. Their shoalest spots may be touched upon by vessels of almost any draught, and the eddies they occasion cause a hollow sea, and the waves break upon them when it blows strong. Those farthest from the land lie on the eastern limit of the 20-fathom line of soundings, which form in the southern part of the North Sea, the deep, known as the deep-soundings channel, which begins at Dover strait, and ends at about lat. $53^{\circ} 20' N$.

The banks are all steep to on their inshore edge, and spread in a gentle slope towards the offing, and as they rise from the submarine bank, composed of sand, gravel, and broken shells, joining the shore, and upon which there are less than 20 fathoms at low water, a simple method is afforded to avoid getting amongst them by not going into less than that depth at that time of tide. The lights at cape Gris-Nez and Calais are in a good position to point out at night their western limit; and the *revolving* light at Dunkerque, seen in clear weather 25 miles, will give notice of approach to the greater part of them. The dangers in the navigation along the shore can only be avoided by placing the vessel under charge of a good pilot; but generally speaking, none of the banks should be approached except a vessel is bound for one of the harbours on the coast.

These banks are divided into two groups; those nearest the shore being named the Dunkerque banks, whilst others lying some distance from the coast were not well known until the late Captain W. Hewett, R.N., surveyed them in H.M.S. *Fairy* between 1831-1840.

DUNKERQUE BANKS, eleven in number, extend 15 miles from the coast between the meridians of Calais and the frontier of Belgium. Their names are, the Sandettié; the Out Ruytingen; the In Ruytingen; the Bergues; the Dyck, the north-east part of which is called the Cliff-d'Islande or East Clif; the In Ratel; the Out Ratel; the Haut-fond de Gravelines; the Breedt; the Smal; and the bank which bounds Dunkerque road to the northward, and which is composed of several parts united together, named, Snouw, Braeck, Hils, and Traepegeer. The other banks, six in number, lying to the northward of the Dunkerque banks, are, the Fairy; the North Hinder; the West Hinder; the East Hinder; the Bligh, and the Thornton Ridge.

SANDETTIÉ (in Flemish the Zand-detié, called also the Ourting by the mariners on this coast), the most western of the Dunkerque banks, is about 12 miles long, in an E. by N. and W. by S. direction, its breadth varying from 4 to 9 cables. Its south and south-east edges are steep-to, having 19 to 20 fathoms water at less than half a cable from the southern edge, but its slope is more gradual towards the north-west, and this side may easily be avoided by the lead.

There are two shallow flats on this bank, over which it would be dangerous to pass in bad weather. The northern flat, with only 21 feet water on it, lies N.N.W. $\frac{3}{4}$ W. 18 miles from Dunkerque lighthouse, and N.E. $\frac{3}{4}$ N. from that at Calais; and the southern flat, on which there are only 20 feet, lies W. by S. $3\frac{1}{2}$ miles from the northern flat; N.W. $\frac{1}{2}$ N. from Dunkerque lighthouse, and N.N.E. $\frac{1}{2}$ E. from that at Calais. Besides these flats, there are other heaps of sand, with 21 to 25 feet on them, spreading $1\frac{1}{2}$ miles in a W. by S. direction from the southern flat; but the depths vary from 31 to 46 feet upon the other parts of the bank.

The Sandettié, rising suddenly from the bottom, causes strong rippings, and when it blows fresh the sea is heavy around it, and breaks upon the shoal flats. From the south-west end of the bank, which is steep-to, in 8 fathoms at low water, the following lights may be seen in clear weather:—Cape Gris-Nez, S.W. 21 miles; Calais, S. by W. $\frac{1}{4}$ W. 13 miles; Gravelines, S.S.E. $\frac{1}{4}$ E. 15 miles; Dunkerque, S.E. $\frac{1}{2}$ E., just visible; and South Foreland lights, W. by N. $\frac{1}{4}$ N. 17 miles. In the daytime, if the weather be clear, the summit of Mont Couple may be recognised, S.W. by S. distant 19 miles; also the South Foreland, and the white cliffs near Dover, bearing W. by N. The north-east end of the Sandettié, upon which there are $8\frac{1}{2}$ fathoms at low water, lies N. by W. $\frac{3}{4}$ W. 18 miles from Dunkerque light; but Gravelines light is too far distant to be seen in ordinary weather.



OUT RUYTINGEN, lying midway between the coast of France and the Sandettié, is separated from the latter by a channel 6 miles wide, with soundings of from 14 to 21 fathoms in it. Its western end begins about 7 miles from the shore on the meridian of Calais lighthouse, and thence it extends 7 miles to the eastward, and then curves 9 miles to the E.N.E., terminating at 12 miles N. $\frac{1}{2}$ W. from Dunkerque lighthouse. The bank rises almost perpendicularly from the bottom on its south-eastern side, and then falls in a gentle slope to the north-west. Those parts upon which there are less than 5 fathoms water, form two flats, $2\frac{1}{2}$ miles apart, with from 5 to 8 fathoms between them; the latter depth lies N.N.W. from Gravelines lighthouse and N.E. from that at Calais, and vessels bound to either of these ports can pass between the flats in this direction at any time of tide.

The western flat of the Out Ruytingen is 3 miles long from West to East, and half a mile broad, and its shoalest spot, upon which there are only 10 feet water, lies with the church-tower of St. Pierre-les-Calais in line with Fienne windmill S.W. by S. southerly; Calais lighthouse, S.W. $\frac{3}{4}$ S.; Gravelines lighthouse S.S.E. $\frac{3}{4}$ E., and Dunkerque lighthouse S.E. by E. $\frac{1}{4}$ E.

The eastern flat is 9 miles long, and half a mile wide, and on its northern part are patches of sand, upon the shoalest of which are only 12 feet water; on the other parts of the flat the depths vary from 18 to 23 feet.

The Out Ruytingen occasions strong eddies, and the sea which breaks upon its shoalest parts when it blows fresh is also heavy upon its edges. There are some irregularities of the bottom, with 6 to 9 fathoms on them, to the westward of this bank, as far as N. by W. from Calais, and small vessels should avoid crossing them in bad weather.

LIGHT-VESSEL.—About one mile from the east end of Out Ruytingen in 8 to 10 fathoms is moored a light-vessel exhibiting at an elevation of 33 feet above the sea, a *revolving red* light, which attains its greatest brilliancy *every half minute*, and is visible in clear weather from a distance of 11 miles. The vessel with mast and ball is painted red, with Ruytingen in white letters, on each side, and lies about $11\frac{1}{2}$ miles N. by W. $\frac{1}{4}$ W. from Dunkerque lighthouse. A bell is sounded in foggy weather.

Buoys.—Three buoys mark the north-west side of Out Ruytingen great bank, viz., North-East buoy, No. 3, black with staff and diamond, about $1\frac{3}{4}$ miles West of the light-vessel, in 10 fathoms water N.N.W. from Dunkerque lighthouse.

The Middle buoy, No. 5, black with a cylinder in 9 fathoms N.W. $\frac{1}{2}$ N. from Dunkerque lighthouse, and N.E. by E. $\frac{1}{4}$ E. from Calais lighthouse; and the South-west buoy, No. 7, black with staff and cone in 8 fathoms N.E. $\frac{1}{3}$ E. from Calais lighthouse.

There are also three buoys marking Out Ruytingen Little bank, viz., North buoy, No. 2, red with staff and cone, point downwards, in $6\frac{1}{2}$ fathoms N.N.W. from Gravelines lighthouse; South buoy, No. 4, red with two cones joined at their points, in 11 fathoms N.N.W. $\frac{3}{4}$ W. from Gravelines lighthouse, and N.E. $\frac{2}{3}$ N. from Calais lighthouse; and West buoy, No. 9, chequered black and white with cone surmounted by a ball, in $6\frac{1}{2}$ fathoms N.W. $\frac{1}{4}$ N. from Gravelines lighthouse, and N. by E. $\frac{3}{4}$ E. from Calais lighthouse.

IN RUYTINGEN lies $2\frac{1}{2}$ miles to the eastward of the Out Ruytingen, and including all the shoal soundings of less than $8\frac{1}{2}$ fathoms, it is 8 miles long, W.S.W. to E.N.E., and 3 miles broad, S.S.E. to N.N.W. From its western extreme Dunkerque lighthouse bears S. by E. $\frac{3}{4}$ E. $9\frac{1}{2}$ miles, and S. by W. $\frac{3}{4}$ W. $12\frac{1}{2}$ miles from its north-eastern extreme.

The In Ruytingen is of a triangular form, and the irregularity of the depths on it causes an uneasy sea. Those parts on which there are less than 26 feet water form two flats, separated from each other by soundings of from 5 to 6 fathoms. The western flat, which occupies the centre of the bank, is 2 miles long from north to south, and $1\frac{1}{2}$ miles wide, with as little as 9 feet on it, which depth lies with Dunkerque lighthouse seen midway between Cassel and the spires at Bergues bearing S. $\frac{1}{3}$ E. The eastern flat lies on the north-east part of the bank, and is $1\frac{1}{2}$ miles long, and its shoalest spot has 14 feet on it. The channel separating the In Ruytingen from the Out Ruytingen is 5 miles long, and carries a depth of from 15 to 18 fathoms; vessels can pass through it by keeping Gravelines lighthouse bearing S.W. $\frac{3}{4}$ S.

BERGUES.—This bank lies one mile to the northward of the north-east flat on the In Ruytingen, and the least depth on it is 23 feet, which lies N. $\frac{3}{4}$ E. $13\frac{1}{2}$ miles from Dunkerque lighthouse. The eastern end of the bank is on the meridian, and 15 miles distant from Dunkerque, and thence it extends $3\frac{1}{2}$ miles to the W.S.W. Some ridges or ridens, with 6 to 8 fathoms on them, lie 2 miles to the East and E.N.E. of this bank, and when the wind blows fresh on a weather tide a heavy sea runs in the eddies formed on their edges, as well as on the edges of the Bergues.

Buoy.—No. 1, a black buoy with staff and ball, lies on the north side of Bergues, in 11 fathoms, N. $\frac{3}{4}$ E. from Dunkerque lighthouse.

WEST DYCK, MIDDLE DYCK, and EAST DYCK form one continued narrow shoal, the several banks on which are separated by soundings of less than 6 fathoms at low water. The south-west end of this shoal commences N.E. $\frac{1}{2}$ N. 6 miles from Calais lighthouse, and thence runs to the eastward parallel to the coast for 18 miles, or as far as the meridian of Dunkerque, and then trends E.N.E. 13 miles. That



part which lies between its western extreme and the meridian of Gravelines is named the West Dyck or Orteil; the centre part, between Gravelines and Grande Synthe, the Middle or real Dyck; and the eastern part is generally known as the East Dyck, or Clif-d'Islande.

West Dyck is 9 miles in length, and its greatest breadth is about half a mile. From the least depth, of 16 feet, Gravelines lighthouse bears S. $\frac{1}{8}$ W. $5\frac{1}{2}$ miles. To the distance of $2\frac{1}{2}$ miles east and west of this shoal spot the depths are from 19 to 27 feet, and towards the western extremity of the bank, N.E. $\frac{1}{4}$ E. from Calais lighthouse, a small patch has been found with 27 feet on it. Small vessels should avoid passing near some patches of 7 and 8 fathoms, which lengthen out this bank to the westward nearly as far as the meridian of Calais, as there is a confused sea on their edges when it blows fresh on a weather tide.

Middle Dyck is one continued flat, 6 miles long in an E. by N. and W. by S. direction, and from 5 to 8 cables broad, and carries from one to 5 fathoms on it at low water. It commences N.N.E. $\frac{3}{4}$ E. 6 miles from Gravelines lighthouse, and ends N. $\frac{1}{2}$ W. 7 miles from that at Dunkerque.

The shoalest part of this flat is $4\frac{1}{2}$ miles long, upon which the depths vary from 5 to 9 feet. From the centre to the east extreme it is extremely dangerous, being steep-to on all sides, but especially towards the north-east, where at 2 cables distance there are from 14 to 15 fathoms water.

East Dyck or Clif-d'Islande is separated from the Middle Dyck by a channel about a mile wide, in which the depth is about 5 fathoms. The south-west end of this bank lies N. $\frac{1}{2}$ E. 7 miles from Dunkerque lighthouse, and thence trends N.E. by E. 14 miles. It is very dangerous throughout its whole extent, as it rises abruptly like a wall from soundings of from 11 to 17 fathoms. Its shoalest part, which is a flat 2 miles long, and upon which there are only from 6 to 9 feet water, commences on the south-west end of the bank, and extends to the north-east as far as the meridian of the lighthouse. On the flats that are formed on the rest of the bank the depths are irregular, and vary from 12 to 17 feet.

The north-east end of this bank, where the depths are only from 3 to 4 fathoms, and around which the sea is always disturbed, is a formidable danger, as it rises abruptly from soundings of 15 and 17 fathoms, and therefore difficult to be avoided by the lead, however quickly it may be hove. The shoal spot of 3 fathoms lies N.E. $\frac{1}{2}$ N. 19 miles from Dunkerque lighthouse; but as this end of the bank is so far from the land, the most remarkable objects cannot be recognised, even from the mast-head, unless the weather is very clear; Dunkerque light may, however, be seen

5 or 6 miles farther off in clear weather. A red and black buoy with staff and ball is moored on the northern edge of this shoal spot.

DYCK LIGHT-VESSEL, moored in 11 fathoms, lies nearly 3 miles N. by W. $\frac{1}{2}$ W. from Gravelines pier lighthouse, and shows from elevations of 34 and 23 feet above the sea, two *fixed* white lights, which should be visible in clear weather from a distance of 11 miles. The vessel is painted red with Dyck in white letters on each side, and will be distinguished by a ball at each mast-head.

The Dyck light-vessel kept just open eastward of Gravelines light will lead through the passage between the Great and Little banks of Out Ruytingen.

IN-RATEL.—This bank is, properly speaking, only a branch of the Middle Dyck, to the south-west end of which it is joined by a narrow sandy ridge, which has gradually risen since 1802. The bank is high and steep-to on all its sides, and from its south-west end in 22 feet, which lies N. by E. $5\frac{1}{2}$ miles from Mardick church tower, it trends E. $\frac{3}{4}$ N. 7 miles, where on its eastern end depths of 18 to 19 feet rise suddenly from soundings of 7 to 8 fathoms at $6\frac{1}{2}$ miles N.N.E. $\frac{1}{2}$ E. from Dunkerque lighthouse. Its extreme breadth, of about a mile, is towards the middle of the bank, where there is a shoal flat 2 miles long, with only from one to 6 feet on it at low water. From this dangerous spot of one foot Dunkerque lighthouse bears S. $\frac{3}{4}$ E. $5\frac{1}{2}$ miles. The channel separating the In-Ratel from the Breedt is barred between the western flats on these banks by a heap of sand, upon which there is only 28 feet water. There are 8 and 10 fathoms in this channel at a short distance east and west of the bar.

OUT-RATEL is an isolated bank, about a mile wide, lying to the south-east and parallel to the East Dyck, from which it is separated by a deep channel $2\frac{1}{2}$ miles wide. Its name, meaning rattle, is perhaps derived from the noise of the heavy sea which runs upon it in bad weather. Near its south-west end, lying about a mile to the northward of the east end of the Breedt, is a dangerous flat, with only 8 feet water on it. This shoal spot lies N.E. $\frac{1}{4}$ N. 10 miles from Dunkerque lighthouse, and thence the bank extends N.E. by E. $\frac{1}{4}$ E. $8\frac{1}{2}$ miles, including the shoal patches, projecting a mile from its north-east extreme.

The Out-Ratel, having many dangerous flats on it with only 9 to 15 feet water, ought not to be crossed, even by small vessels, without using great prudence. It is separated from the East Dyck, as well as from the eastern end of the Breedt, by soundings of from 8 to 12 fathoms. A small bank, with only 25 feet on it, lies N.N.W. $\frac{1}{4}$ W. $1\frac{1}{2}$ miles from its north-east end,

and is separated from it by soundings of 10 to 13 fathoms. By not bringing Ostende lighthouse to the eastward of S.E. $\frac{1}{2}$ S., a vessel will keep to the northward of the banks, lying between the East Dyck and Middelkercke bank, which latter is the most western of the Ostende banks.

HAUT-FOND de GRAVELINES, a small flat of sand nearly a mile in extent, and upon which there is only 18 feet water, lies 2 miles to the westward of the west end of the Breedt bank, upon the centre of an elevation from the bottom, extending as far as N.N.W. of Gravelines lighthouse. From the shoalest spot on the flat, Gravelines lighthouse bears S. by W. $\frac{1}{2}$ W. $3\frac{3}{4}$ miles, and Dunkerque lighthouse S.E. by E. $\frac{3}{4}$ E. $9\frac{1}{2}$ miles.

BREEDT, the broadest of the Dunkerque banks, joins the In-Ratel by a bar of sand with 28 feet water on it. Its western extreme, where the most dangerous parts commence, lies N. $\frac{1}{4}$ W. 3 miles from the high sand-hills on Gravelines point, N.E. $\frac{1}{4}$ N. $4\frac{3}{4}$ miles from Gravelines lighthouse, and N.W. by W. $\frac{1}{4}$ W. 8 miles from that at Dunkerque. From thence it trends E. $\frac{3}{4}$ S., $6\frac{1}{2}$ miles, and then E. by N. $\frac{3}{4}$ N. 8 miles to its eastern extreme in 24 feet water, which lies N.E. $\frac{1}{2}$ E. $9\frac{1}{2}$ miles from Dunkerque lighthouse, and N.N.W. $\frac{1}{4}$ W. $9\frac{1}{2}$ miles from Furnes.

There are three dangerous flats upon the Breedt. The western flat, with only 3 feet water on it, lies $3\frac{1}{2}$ miles from the shore, and from its centre Mardick church tower bears S. $\frac{1}{4}$ W. The middle flat, the highest part of which uncovers 5 feet at the lowest tides, is of an oval shape, $2\frac{1}{4}$ miles long and 2 broad; from the part that uncovers Dunkerque lighthouse bears South $3\frac{1}{2}$ miles. The third flat, $3\frac{1}{2}$ miles long and 3 cables broad, commences N.E. by N. 4 miles from Dunkerque lighthouse, and ends about W.S.W. 2 miles from the eastern end of the bank: there is a depth of only 6 feet on its western part, and the remainder of the flat carries from 8 to 9 feet; the western end is separated from the eastern edge of the middle flat by an interval of $1\frac{1}{2}$ miles, with 2 to 3 fathoms in it.

EAST BREEDT is from 4 to 5 cables wide, and carries from 13 to 18 feet on it. A narrow channel, 5 miles long in an E.N.E. and W.S.W. direction, and in which the depths are from $4\frac{1}{2}$ to 8 fathoms, separates the north-east end of the Breedt bank from the south-west extreme of the East Breedt; this extreme lies N.E. by E. $14\frac{1}{2}$ miles from Dunkerque lighthouse, and thence the bank extends N.E. by E. 5 miles, and terminates in some shoal patches of 25 feet, the most eastern of which lies a little to the eastward of the meridian of Furnes, and N. $\frac{1}{4}$ E. from Nieupoort. From this position at night, Dunkerque light bears S.W. by W. 19 miles, and Ostende light S.E. $\frac{1}{2}$ E. 10 miles.

SMAL.—The western end of this bank lies $2\frac{1}{4}$ miles from Dunkerque lighthouse, with the lighthouse in line with Dunkerque tower, and is connected with the middle flat on the Breedt bank by soundings of 15 to 22 feet water. From its western end it trends E. $\frac{1}{4}$ N. 6 miles, and then N.E. by E. $\frac{3}{4}$ E. $8\frac{1}{2}$ miles, to its north-east end, which lies about N. $\frac{3}{4}$ E. $9\frac{1}{4}$ miles from Furnes, and N. by W. $\frac{1}{2}$ W. from Nieuport. The southern part of this bank bounds Nieuport road to the north, and is extremely steep to N.N.E. of Sables tower.

A dangerous flat, about $7\frac{3}{4}$ miles long and carrying only from 2 to 7 feet water, rises from the Smal bank, commencing N.E. $\frac{1}{2}$ N. 3 miles from Dunkerque lighthouse, and extending without interruption as far as N. by W. $\frac{1}{4}$ W. from Furnes. It is joined to the flat on Hils bank by shoal water, of 3 to 16 feet, the centre of which lies with Dunkerque tower seen just open to the eastward of Leugenaerd tower. Between the east end of the flat and the north-east extreme of the bank are several isolated patches, upon which there are only 10 to 16 feet water.

The Smal bank is joined to Nieuport bank by a narrow bar, with 18 feet water on it, lying with the towers at Furnes in one with the eastern part of a high sand-hill, named Broers-Duyn bearing S. $\frac{1}{4}$ W.

SNOUW.—The successive parts of the bank which bounds Dunkerque road to the northward are named the Snouw, the Braeck, the Hils, and the Traepegeer. The western portion of Snouw bank is 4 miles long in an E. by S. and W. by N. direction, and its highest parts form a narrow flat $2\frac{1}{4}$ miles long, with as little as 2 feet water on it. The western end of the Snouw is 2 miles from the shore, N.E. $\frac{2}{3}$ E. 4 miles from Gravelines lighthouse, and N.W. by W. $\frac{3}{4}$ W. $7\frac{3}{10}$ miles from Dunkerque lighthouse.

A red and black bell buoy with reflector is moored on the west extreme of the Snouw, in about $5\frac{1}{2}$ fathoms water, it lies $1\frac{1}{2}$ miles N.W. by W. $\frac{3}{4}$ W. from the Snouw light-vessel.

LIGHT-VESSEL.—The Snouw or Mardyck light-vessel, red with mast and ball, with Mardyck painted in white letters on her sides, lies in 11 fathoms near the west end of the Snouw, and shows a *fixed red light*, visible in clear weather 7 miles. This vessel lies $5\frac{2}{3}$ miles E. by S. $\frac{1}{2}$ S. from the Dyck light-vessel, and when in line with the latter leads into Dunkerque road.

BRAECK.—This bank is a continuation of the Snouw, and is joined to it by soundings of from 7 to 8 feet. It is 6 miles long in an E. by S. $\frac{1}{2}$ S. and W. by N. $\frac{1}{2}$ N. direction, beginning about 2 miles from the shore on the meridian of Mardick, and ending on the meridian of the Pilot's mast erected on the shore about a mile to the eastward of Dunkerque.



Upon its highest parts which form a flat from one to 3 cables wide are only one to 2 feet water, and there are even some dry patches on it at the lowest tides. The Braeck is steep-to, its sides rising from the bottom like a wall, and, with northerly winds the sea breaks upon it with great fury. Its south-west end has increased considerably since its highest parts have united with those of the Snouw, and this end is now connected with the shallow flats joining the shore, by a sandy shoal running to the W.S.W., and forming a sort of bar across the West Pass to Dunkerque road, upon which there are from 29 to 33 feet at low water.

HILS, a continuation of the Braeck, takes an easterly direction for $3\frac{1}{2}$ miles from the meridian of the coast guard house, standing on the shore to the eastward of Dunkerque, and terminates suddenly in soundings of from 17 to 22 feet, at 2 miles from the shore, and N. by E. $\frac{1}{4}$ E. of Zuydcoote tower, called also Sables or Sands tower. The highest parts of this bank form a flat 2 to 6 cables broad, upon which there are irregular depths of from 2 to 6 feet at low water, and there are also patches lying about N.E. by E. from Dunkerque lighthouse, which dry 6 feet at the same time of tide. The south side rises precipitously from a depth of from 45 to 50 feet, and the east side from 17 to 22 feet, rendering it exceedingly dangerous to vessels turning to windward in the eastern part of Dunkerque road.

TRAEPEGEER bounds Dunkerque road to the eastward, and is connected with Hils bank by soundings of from 17 to 22 feet, which form what is called the East or Zuydcoote Pass. The Traepegeer joins the shore towards a high sand-hill named the Broers Duyn, and extends thence along the coast to the entrance to Nieuport. Its western extreme, upon which there are from 9 to 16 feet at low water, is only 2 cables from the south-east end of the shoal flat of Hils bank, and bears N. by E. $\frac{1}{4}$ E. from Sables tower.

BANKS NORTH of DUNKERQUE BANKS.—The position, extent, and depth of water on the following banks (noticed in page 151), north of the Dunkerque banks, are the result of the labours of the late Capt. W. Hewett, R.N., in H.M.S. *Fairy*, from 1831 to 1840.

FAIRY BANK, a high sandy ridge, with 4 to 9 fathoms on it, rises from the eastern edge of the deep-soundings channel. Its southern end in 8 fathoms lies N. by E. 18 miles from Dunkerque lighthouse, and thence the bank extends N.E. $\frac{1}{4}$ E. 10 miles, its greatest breadth not exceeding 8 cables.

There are two flats on this bank; the one near its middle is $2\frac{1}{2}$ miles long, and its shoalest spot of 4 fathoms lies N. by E. $\frac{1}{4}$ E. 21 miles from Dunkerque lighthouse, and S. by E. $\frac{1}{4}$ E. $25\frac{1}{2}$ miles from the Galloper light-vessel. The lighthouse may be seen in clear weather from the south end of the bank, and also from the West Hinder.

A shoal, with 6 to 9 fathoms on it, lies 2 miles to the westward and parallel to the Fairy.

NORTH HINDER, a dangerous sand bank, situated like the Fairy on the eastern edge of the deep-soundings channel, is 7 miles long in a N.E. by N. and S.W. by S. direction, and 5 or 6 cables broad, the general depth on it being from 6 to 9 fathoms; but a narrow flat, with 4 and 5 fathoms on it, rises on its southern part, and extends 2 miles to the southward from about the middle of the bank, and is steep-to on its eastern side. The north end of the bank lies S.E. by E. $\frac{1}{2}$ E. $24\frac{1}{2}$ miles from the Galloper light vessel, and the south end N.E. by E. $8\frac{1}{2}$ miles from the Fairy.

The North Hinder may be considered as an extension of the Fairy, and between these banks are three flats, two of which, with 8 to 10 fathoms on them, occupy a space 3 miles in length midway between the banks; and the third, with 9 fathoms on it, lies 2 miles to the eastward of the north end of the Fairy. The line joining the fairy to the North Hinder may be considered as a boundary, to the eastward of which vessels ought not to go under any circumstances.

NORTH HINDER LIGHT VESSEL, moored in 20 fathoms water, on the eastern side of the North Hinder bank, exhibits from her mainmast head at an elevation of 40 feet above the sea, a *flashing* white light, at intervals of *eight* or *ten seconds*, visible in clear weather from a distance of 11 miles. The vessel has two masts and is coloured red, with the words Noord-Hinder painted in large white letters on her sides. During the day a red ball is hoisted at her mainmast head, and in thick foggy weather a bell is struck every quarter of an hour, preceded and followed by strokes of a gong.

Whenever the apparatus of the light is out of repair, a *fixed* white light will be exhibited in lieu of the *flashing* light, and a *flare* light will be shown *every ten minutes* just above the bulwarks.

A red buoy is also placed in 6 fathoms water N. $\frac{1}{3}$ E. 2 miles from the light-vessel, with the word Hinder marked on it in white letters; and it will be prudent for vessels of large draught to keep to the northward of the buoy to avoid the shoal patches on the Hinder.*

WEST HINDER, a sand bank 15 miles long and about 7 cables broad, lying to the eastward of the Fairy, and to the southward of the North Hinder. From its south end in 9 fathoms, which lies N.N.E. $\frac{1}{4}$ E. $18\frac{1}{2}$ miles from Dunkerque, N.W. by W. $\frac{3}{4}$ W. $4\frac{1}{2}$ miles from the north-east of the East Dyck, and E. $\frac{3}{4}$ S. 5 miles from the south end of the Fairy, the bank trends N.E. $\frac{3}{4}$ E. $8\frac{1}{2}$ miles, and then N.E. $\frac{3}{4}$ N. $6\frac{1}{2}$ miles to

* The position of this buoy is not to be depended on.



its northern end, which is $1\frac{1}{2}$ miles S.S.E. of the south extreme of the North Hinder. A flat occupies nearly the whole length of the bank, and forms a sort of continuous crest, upon which the depths are from 3 to 5 fathoms.

The only passage practicable for large vessels bound to Flushing and Antwerp, and intending to enter the Schelde by the Wieling Gat, is between the Out Ruytingen, the Bergues, and the East Dyck on one side; and the Fairy and the West Hinder on the other.

WEST HINDER LIGHT-VESSEL.—Near the S.W. end West Hinder bank, in 17 fathoms, in lat. $51^{\circ} 22' 3''$ N., long. $2^{\circ} 26' 26''$ E., is moored a light-vessel, which exhibits from an elevation of 40 feet above the sea a *revolving* light, showing two bright, and one *red* light, at *half minute* intervals, and visible in clear weather from a distance of 12 miles. The vessel is black with red streaks, with the words West Hinder painted on each side; and a skeleton framework at mast head.

Buoy.—A black buoy is also placed in about 9 fathoms, bearing N. $\frac{1}{4}$ W. a little more than half a mile from the light-vessel, and nearly midway between it and the south-western extreme of the shoal part of the bank, upon which there are but 3 fathoms water; it would be advisable not to go to the northward of this buoy.

EAST HINDER, a sand-bank $11\frac{1}{2}$ miles long in a N.E. by N. and S.W. by S. direction and 6 or 7 cables broad, lies to the eastward of the West and the North Hinder; it has three flats on it, which occupy nearly its whole extent, and carry from 4 to 5 fathoms water. The bank is steep-to on both sides, and is separated from the North Hinder by a channel 4 miles wide, with 15 to 19 fathoms in it. The north end of the bank, in 9 fathoms, lies S.E. $\frac{1}{4}$ S. 4 miles from the north extreme of the North Hinder; and the south end, N.E. $\frac{3}{4}$ N. 9 miles from the north extreme of the East Dyck.

About midway between the south end of the East Hinder and the East Dyck there is a narrow shoal $4\frac{1}{4}$ miles long, with from 5 to 8 fathoms on it; it lies $1\frac{1}{2}$ miles to the eastward of the West Hinder, and its south extreme is 2 miles to the northward of the northern termination of the East Dyck.

BLIGH BANK, composed of sand, is 10 miles long, from half to a mile broad, and lies 3 miles to the eastward and nearly parallel to the East Hinder. Its northern end, upon which there are 8 fathoms, is in lat. $51^{\circ} 41\frac{1}{2}'$ N., long. $2^{\circ} 48' 9''$ W., and lies N.W. $\frac{1}{3}$ W. 26 miles from the light at West Kapelle, and S.E. by E. $\frac{2}{3}$ E. 33 miles from the Galloper light-vessel; its southern end, in 5 fathoms, lies E. $\frac{1}{2}$ N. $4\frac{1}{2}$ miles from the south extreme

of the East Hinder, and N.E. $\frac{1}{2}$ E. 13 miles from the north end of the East Dyck.

This bank is steep-to, and has irregular depths of from 5 to 9 fathoms on it. A flat, $1\frac{1}{2}$ miles long, rises perpendicularly from soundings of from 14 to 18 fathoms at about 3 miles from its southern end. There are 5 fathoms on the flat, and there is also a patch, with the same depth on it, near the north end of the bank.

Another patch, with 9 fathoms on it, lies $1\frac{1}{2}$ miles to the northward of Bligh bank, and the soundings for the distance of 25 miles to the N.N.E. and N.E. by N. are very irregular, in some places only 13 and 14 fathoms; whence it follows, that the lead will be an uncertain guide when approaching the North Hinder, the East Hinder, or the Bligh bank, from the north-eastward.

THORNTON RIDGE.—This sand-bank is 13 miles long east and west, with a mean breadth of $1\frac{1}{2}$ miles, and rises from soundings of from 12 to 17 fathoms at 15 miles from the coast of Belgium, and out of sight of Dunkerque, Ostende, and West Kapelle lights. A flat, $2\frac{1}{2}$ miles long and half a mile wide, with 2 to 3 fathoms on it, lies towards the eastern end of the ridge; the shoalest spot of 2 fathoms lying N.N.E. easterly, about 19 miles from Ostende lighthouse. The general depth on the other parts of the ridge is from 6 to 9 fathoms.

The west end of the ridge lies S.S.E. 3 miles from the south extreme of Bligh bank, and the interval separating them is the least dangerous channel that large vessels can take, if they intend passing amongst the banks, when bound to the northward with S.W. winds from Dunkerque.

Nearly midway between Bligh bank and Thornton ridge are three narrow shoals, occupying a space of 9 miles in an E.N.E. and W.S.W. direction, and carrying from 8 to 9 fathoms water. The western shoal lies E. $\frac{1}{4}$ S. $3\frac{3}{4}$ miles from the flat on Bligh bank, and N.W. $\frac{3}{4}$ N. $5\frac{1}{4}$ miles from the shoalest spot on Thornton ridge.

A succession of shoals, with 6 to 9 fathoms on them, also lie between Thornton ridge and the Out-Ratel, within sight of Ostende light. They occupy a space 10 miles long in an east and west direction, and the shoalest spot on them, $5\frac{1}{2}$ fathoms, lies N. by E. $\frac{1}{2}$ E., 11 miles from Ostende lighthouse; but none of them are dangerous, and they have only been described here, as they may be crossed by vessels coming out of the Zuydcoote Pass, and they will then serve as a guide to assure them that they are in a good tract.

ASPECT of COAST.—The sand-hills composing the coast between Calais and Gravelines may be seen in clear weather at 8 or 9 miles, but some of them are so low and unstable that embankments are thrown up to



protect the land from the invasion of the sea. The only objects that can be recognised on the level land adjoining the shore are, the two windmills at Walde, Oye church spire, and two windmills standing near Oye village.*

At low water the sandy beach extends more than a mile from the shore between Calais and the meridian of the Walde windmills, as well as off the entrance to Gravelines; but along the intermediate coast its breadth varies from half to three-quarters of a mile. The depths adjoining the beach, that are less than 4 fathoms, extend 2 miles from the shore N.N.E. of Calais church, and abreast Gravelines, and about a mile from the shore between Walde and Oye windmills; between the outer edge of these soundings and high-water mark the slope of the bottom is rapid and irregular, which tends to cause a heavy sea when the wind blows upon the shore.

WALDE LIGHT.—Near the edge of the sandy beach nearly a from the shore abreast Walde Mill, and $3\frac{1}{4}$ miles E. by N. $\frac{1}{4}$ N. from Calais lighthouse is an iron beacon, from which at an elevation of 34 feet is exhibited a *flashing* white and red light alternately at intervals of *twenty seconds*, visible in clear weather from a distance of 10 miles.

PORT de GRAVELINES.—The entrance to this small tidal harbour for fishing and coasting craft, lies 10 miles to the eastward of Calais, and its position may be easily recognised by the houses of the village of Fort Phillippe, built close to the sea on each side the entrance channel, by a windmill standing about a quarter of a mile to the eastward of the village, and by the fine tower of the lighthouse. The principal articles of trade are wine, brandy, gin, salt, timber, salt-fish, refined sugar, beer, &c. Vessels are fitted out for the herring, cod, and mackerel fisheries.

This harbour is only accessible to vessels of 14 feet draught at the utmost at high-water springs. At weak springs those of $11\frac{1}{2}$ feet can enter it during 5 or 6 days, that is, 2 or 3 days before full and change, and 3 days after. It affords good shelter at the springs to vessels of about 12 feet draught during westerly gales, and especially those between W.S.W. and W.N.W., when the sea is not heavy at the entrance; but the bar should be crossed at the time of high water. In a gale from E.N.E. to

* The telegraph cable between France and Denmark (from Calais to Fano island), is immersed near the Huttes d'Oye, in latitude $50^{\circ} 59' 40''$ N., longitude $2^{\circ} 1' 39''$ E., and lies in the direction of N. 6° E. as far as latitude $51^{\circ} 7' 10''$ N., and longitude $1^{\circ} 59' 39''$ E., at which point it takes the direction of N. 38° E.

The first of these two directions is indicated by two beacons, each surmounted with a hexagonal prism, partly white and partly red.

Vessels should not anchor in the direction indicated above.

East they should run in with the flood, for after high water there will be some difficulty in stemming the ebb. The tide rises much higher with strong northerly winds, but as the sea is then very high at the entrance no vessel drawing more than 12 feet should attempt to enter, unless she is embayed, and there is an impossibility of reaching the anchorage in Dunkerque road, which is the only place on this coast where, with those winds, a vessel could find a little shelter.

Pilots cannot get out to vessels when the sea is high on the bar, but they wave a flag in the direction they should steer.

A red flag is hoisted on a staff erected on the shore at the commencement of the west jetty during the time the entrance is practicable, and kept up as long as there is sufficient water for the fishing vessels.

The Channel, leading into this harbour, runs S. by E. $\frac{1}{2}$ E. 2 miles in a direct line from the entrance, and consists of two distinct parts, one bounded by the beach, and the other by the land between the village of Fort Phillippe and Gravelines.

The outer part of the channel, 8 cables long and 305 feet wide at the entrance, is enclosed between two low stone jetties, which, for half their length from the shore, are not covered during the neaps. The end of the west jetty is 18 feet above the lowest tides, and is marked by a red beacon surmounted by a structure of open framework; the extremity of the east jetty, 15 feet above the lowest tides, is marked by a large wooden beacon surmounted by a wooden lantern and weathercock. Both jetties have beacons on their whole length secured by strong woodwork, by means of which vessels warp in. Abreast the extremity of the east jetty, the level of the fresh water which runs out of the harbour when the tide is out, is 3 feet above the level of low-water great springs.

The inner part of the channel between the village of Fort Phillippe and the harbour is a little better than a mile long, and half a cable broad, and is enclosed between two embankments, which serve for towing-paths. The mud deposited in the channel forms a steep slope on either side.

The Harbour is situated on the north-west side of the town, at the mouth of the river Aa, the abundant freshes of which during rain and the melting of the snow clear both it and the entrance channel of the mud and sand which accumulate there in dry weather. It is about $1\frac{1}{2}$ cables long, and occupies about half the breadth of the channel by which the course of the Aa has been straightened between the ditches of the western part of the fortifications and the entrance channel. The berths of muddy sand, upon which vessels are placed alongside the stone quay bordering the whole length of the harbour on the town side, are $4\frac{3}{4}$ feet above the level of low-water great springs. The swell from outside never reaches the harbour.

A line of piles, commencing at bridge No. 1 near little Fort Phillippe and extending towards the north-west, uncovers about $3\frac{1}{4}$ feet above the level of low water; the extreme is marked by a perch buoy with a red and white flag, and when entering should be left to port. This line of piles serves to guide vessels to the south-east of a bank of ooze formed off Great Fort Phillippe.

Bar.—The entrance to the channel leading to the harbour is frequently obstructed by a bar formed of the sand driven by westerly winds and the sea from the beach to the westward. The height and extent of this bar depend upon the duration of these winds, as well as upon the body of fresh water out of the harbour. At its medium state it is from 2 to 3 feet above the level of the fresh water running through the channel when the tide is out, or 5 or 6 feet above the level of the lowest tides. It sometimes disappears for several days during the great freshes of the river Aa, when there is a strong N.E. wind.

LIGHTS.—Gravelines lighthouse, of a light red colour and resembling a Doric column, stands at the eastern side of the entrance, in the west part of the village of Little Fort Phillippe, at 175 yards from the shore, and 65 yards from the eastern bank of the entrance channel. It exhibits, at 95 feet above high water, a *fixed* white light, dioptric and of the third order, visible at 14 miles.

Two *fixed* white tide lights, 65 yards apart, and each 20 feet above high water, are shown on the shore at the village of Great Fort Phillippe, at the commencement of the west jetty, from 2 hours before till 2 hours after high water, and when in one they point out the direction of the entrance. Both lights are catoptric and of the fourth order, and may be seen from a distance of 6 miles.

A *fixed green* light is exhibited from the extremity of the north-east pier of Gravelines harbour, during the time there is sufficient depth of water for vessels to enter the harbour. This light will continue to be shown until the completion of the north-west pier.*

A Life Boat is stationed at Gravelines.

Directions.—Vessels arriving off Gravelines harbour sometime before the tide serves to enter, may anchor north of Oye church spire, at $1\frac{1}{2}$ or 2 miles from the shore, in 5 to 8 fathoms, over excellent holding ground. This anchorage, however, is only safe for a few hours during fine weather, for the sea is heavy when the wind blows upon the shore.

The most favourable winds for entering the harbour are those from N.N.W. round northerly, to N.E., but when they blow fresh, cause a high sea at the entrance, and it will then be necessary to be quite certain there is sufficient water over the bar without danger of striking. With fresh

* Annonce Hydrographique, No. 54 of 1881.

winds from W.S.W. to W.N.W. the sea is smooth on the bar, but there is then a difficulty in getting through the entrance channel when the low jetties are covered, for the flood stream, and the sea crossing it, may drift a vessel upon the east jetty. The entrance is easy with N.E. winds, when they are sufficiently strong to stem the flood, which is at its greatest strength when it is high water in the harbour. With a head wind a vessel is tracked in and placed on the ground in the inner part of the channel.

The best time for entering the harbour is about an hour before high water; but as the stream at that time runs strong across the entrance, there will be some difficulty in keeping in the deepest parts of the channel; if the vessel, however, takes the ground she may float again before the tide has done rising. The bowers and a stern anchor must be ready to let go, and hawsers to run out should she be drifted upon the east jetty. Sufficient sail should also be carried to ensure good steerage, especially during the autumn and winter months, when it may blow fresh in the offing whilst the breeze is light near the shore, which circumstance would place a vessel in considerable danger in the great swell on the bar. In entering the channel with westerly winds, whatever may be their strength, and also with light easterly winds, pass close to the northward of the outer West beacon; with fresh easterly winds pass either close to the northward of the outer east beacon, or run directly for the middle of the entrance.

Tides and Tidal Signals.*—It is high water, full and change, in Gravelines harbour at noon, springs rise 19 feet, neaps 15 feet. And (above the level of the fresh water which runs out of the harbour when the tide is out, and which is about 3 feet above the level of the lowest tides,) ordinary springs rise 18 feet; equinoctial springs $19\frac{3}{4}$ to $20\frac{1}{2}$ feet; ordinary neaps $11\frac{1}{2}$ to $13\frac{3}{4}$ feet. By deducting 2 feet from these heights, the rise of water on the bar, supposing it to be in its medium state, will be found. Strong winds from N.W. to N.N.W. cause the tide to rise higher, and those from S.E. have a contrary effect.

The tide rises slowly for the first three hours, but its rise is rapid from the third to the fourth hour; it then slacks gradually till high water. At springs the high-water slack in the harbour continues about 15 minutes in calm weather, 20 to 25 minutes with westerly winds, and 10 minutes at the utmost with off-shore winds; but as there is little rise or fall for the last half hour flood and the first half hour ebb, there is a period of nearly $1\frac{1}{2}$ hours for moving vessels in and out without danger of grounding.

The new system of tidal signals, noticed in page 3, is used at this port.

ASPECT of COAST.—The low plain behind the shore between Gravelines and Dunkerque presents no remarkable objects visible at sea;

* For day tidal signals, see page 3, and for night tidal signals, see page 165.

the only high land that can be seen in clear weather are two isolated hills, named Great and Little Cassel, rising S. $\frac{1}{2}$ W. from Dunkerque. The town of Cassel stands on the summit of the larger, and the other hill is in the form of a cone. The buildings that may be recognised on the coast are the tower and lighthouse at Dunkerque, and the church towers of Grande and Petite Synthe and Mardick. Gravelines point, bearing E. $\frac{1}{2}$ N. $3\frac{1}{2}$ miles from Gravelines lighthouse, is of a rounded form and the sandhills composing it lie in several parallel ridges and are visible in clear weather 9 or 10 miles. A chain of sand-hills covered with verdure extends 2 miles in a W.S.W. direction from the point.

The sand-hills bordering the shore for about 2 miles to the eastward of Gravelines point are about the same height as those at the point, but beyond this, and to within a short distance of Dunkerque, they are covered with bent grass, and lie in parallel ridges at half a mile in the rear of an embankment, fronted by low land, which is covered at spring tides.

Between the entrance of Gravelines and Gravelines point the beach dries out half a mile at the springs; abreast the point it dries 3 cables, the extreme edge being marked by a beacon; and between the point and Dunkerque it dries 6 or 7 cables. The sand which is carried to the eastward by strong westerly winds is arrested by the jetties at Dunkerque, and accumulates on the beach between Mardick and Dunkerque, where it forms an immense heap, the highest parts of which are barely covered at the springs. Of all the obstacles which oppose themselves to the improvement of Dunkerque this high beach is the most difficult to overcome, for the sand from it is forced over the west jetty, and forms a bank several feet high at the end of the jetty and across the entrance.

The soundings off this part of the coast, within a depth of 5 fathoms, are very irregular, and the sea is heavy when the winds blow on the shore. Between the entrance to Gravelines and Gravelines point these soundings extend 2 miles from the shore, and amongst them lies a deep, named Fosse de Mardick, which, although carrying from 26 to 29 feet water, should always be avoided. This deep is separated from the West Pass leading to Dunkerque road by the eastern end of a shoal, with 11 to 19 feet over it, which extends to the westward as far as the meridian of Gravelines lighthouse. Another shoal, the edge of which is steep-to, joins the beach between Mardick and Dunkerque, and extending $1\frac{1}{2}$ miles from the shore forms the southern boundary of the West Pass; its western end lies N. by W. $\frac{1}{4}$ W. of Mardick church tower.

PASSE de l'OUEST, or West Pass into Dunkerque road, is about 4 miles long, and lies between the shoal flats joining the shore and the Snouw bank. The entrance to it, as well as the direction it follows, is marked by the following buoys:—

A striped red and black buoy, with bell and reflector, is moored at the western extremity of the Snouw at the entrance of the Pass, and must be left on the port hand in entering.

The northern edge of the Pass, as well as the most dangerous parts of the steep edge of the Braeck bank, are marked by the following five black buoys each marked with a staff, which must also be left on the port hand in entering :—

Black buoy No. 1 is moored midway between the buoy with bell and reflector and the Snouw light-vessel.

Black buoy No. 3 is moored on the southern edge of the Snouw, nearly $1\frac{1}{4}$ miles E. $\frac{1}{4}$ N. from the Snouw light-vessel.

Black buoy No. 5. is moored $1\frac{1}{2}$ miles farther to the eastward near the western edge of the Braeck bank ; but a narrow part of this bank, with 17 to 19 feet on it, extends nearly $1\frac{1}{4}$ miles to the westward of the buoy, and is dangerous to vessels of large draught running into Dunkerque road with a strong westerly wind at low water.

Black buoy No. 7 is moored in 20 feet water upon the southern edge of the Braeck bank, about a mile to the eastward of Black buoy No. 5.

Black buoy No. 9 is moored on the southern edge of the Braeck bank, about $1\frac{1}{4}$ miles eastward of No. 7.

The southern edge of the West Pass, as well as the southern limit of the western part of Dunkerque road, are marked by seven red buoys moored upon the outer edge of the dangerous flats joining the shore as follows :—

Red buoy No. 2 marks the N.W. edge of the bank, and lies $2\frac{3}{4}$ miles W. $\frac{1}{4}$ N. of Snouw light-vessel. It is necessary to see this buoy either when entering or leaving the pass. A pilot vessel generally lies at anchor near it.

Red buoy No. 4 lies on the edge of the 18 feet soundings joining the beach about $1\frac{1}{4}$ miles E. by S. from red buoy, No. 2, and S. by W. $\frac{1}{4}$ W. three-quarters of a mile from the buoy, with bell and reflector.

Red buoy No. 6 lies upon the edge of the same soundings, about one mile eastward of red buoy No. 4, and South three-quarters of a mile from black buoy No. 1.

Red buoy No. 8 lies on the south side of the western part of Dunkerque road, $1\frac{1}{4}$ miles east of No. 6 buoy.

Red buoy No. 10 lies about one mile east of No. 8 buoy.

Red buoy No. 12 lies $1\frac{1}{2}$ miles east of No. 10 buoy.

Red buoy No. 14 lies $1\frac{1}{4}$ miles east of No. 12 buoy.

The northern limit of the eastern part of Dunkerque road is marked by two red buoys, the eastern one having a staff and ball. The western red buoy No. 8, is moored on the southern edge of the Braeck bank,

N. by E. $\frac{1}{2}$ E. from the entrance to Dunkerque; and the eastern red buoy, No. 6, lies upon the southern edge of Hils bank, E. $\frac{1}{2}$ S. $1\frac{1}{4}$ miles from red buoy No. 8.

PASSE de ZUYDCOOTE, or East Pass into Dunkerque road, runs in a N.E. $\frac{1}{2}$ E. and S.W. $\frac{1}{2}$ W. direction between Hils and Traepegeer banks, and carries 17 to 22 feet at low water; its limits are marked by one black and two red buoys. The southern red buoy with staff and ball, No. 4, marks the south-east edge of Hils bank; the northern red buoy, with staff and ball, No. 2, the north-east edge; and the black buoy No. 1, the north-west edge of the Traepegeer. It is necessary to observe that the red buoys upon the eastern slope of Hils bank, which is very steep, sometimes drift and cross the Zuydcoote Pass to the western slope of the Traepegeer; this frequently happens to red buoy, No. 4.

Directions.—When the flood stream begins to be felt in Dunkerque road, which is about the time of half flood in the harbour, the tide has risen 9 feet in the Zuydcoote Pass, and the largest vessels that can enter Dunkerque may at that time pass over the south-west end of the Traepegeer by keeping the spires of Bergues church open about a degree to the westward of Leffrinckoucke church tower bearing about S.W. by S.

If a vessel's draught will permit her to turn through the Zuydcoote Pass between half flood and half ebb, the lead must be hove quickly to avoid coming suddenly upon Hils bank; and in standing to the eastward she should not open the spires of Bergues more than two degrees to the eastward of Leffrinckoucke church tower. In thick weather, should the spires not be visible, she may run through this Pass, if Sables tower be seen, by steering for it on a S. by W. $\frac{1}{2}$ W. bearing.

RADE de DUNKERQUE being narrow, and only sheltered by banks always covered, must only be considered as a temporary anchorage for vessels whose draught will permit them to enter the harbour; it might, however, in case of necessity, afford shelter to ships of the largest draught. Sharp vessels deeply laden will be in some danger from the heavy sea, but with this exception the pilots consider that with good ground-tackling a vessel might ride out a gale from the offing.

The road is comprised between the outer edge of the 5-fathom line of soundings joining the shore, and the Braeck, the Hils, and the Traepegeer banks. It extends from the western end of the shallow flat on the Braeck, N.E. of Mardick tower, to the entrance of the Zuydcoote Pass, and is separated into two deeps by a sandy bottom 3 cables wide, the centre of which lies N.N.W. $\frac{1}{2}$ W. from Dunkerque lighthouse. There are 5 to 8 fathoms on this sandy bottom; but the holding ground is bad in the

deepest water. A pilot vessel generally lies at the entrance of the West Pass, not far from red buoy No. 2.

The western of these deeps, in which the soundings are from 8 to 9 fathoms, good holding ground, commences N.E. of Mardick tower, and extends to the sandy bottom just mentioned, and is in some degree sheltered from the high sea during northerly gales by the high flat on the Braeck bank. It is in this part of the road that vessels of large draught anchor with westerly winds and a heavy sea, when they have to wait for high water to enter Dunkerque. Small vessels under similar circumstances can anchor N.W. about a mile from the entrance of the harbour, in the southern part of the sandy bottom, as the holding ground there is good and the depths from 5 to 7 fathoms; this is also a good position for all vessels with off-shore winds.

The eastern deep commences with Heuguenar tower in line with Dunkerque lighthouse, and extends to the Zuydcoote Pass; the depths in it vary from 8 to 11 fathoms, and the holding ground is good, particularly N.N.E. of Dunkerque. Large vessels requiring to remain some time in Dunkerque road should anchor in this deep between the lines on which Heuguenar tower is seen touching the eastern side of the lighthouse, and the same tower in one with Dunkerque tower, where they will be better sheltered than in the western deep against the heavy sea during gales from N.N.W., round northerly to E.N.E. by the high flats on Braeck and Hills bank; and in the event of their parting it will be much less dangerous to run ashore to the eastward than to the westward of Dunkerque. A vessel at anchor in any part of the road should have a spare anchor ready to let go as soon as the wind veers and threatens to blow from the northward.

Tides.—The first of the flood stream in Dunkerque road comes from the N.N.W.; as it gains strength its direction is more to the eastward, and at its greatest speed, which lasts about two hours, it runs straight through the road. It then decreases rapidly, and after a few minutes slack water the ebb stream commences, which runs first to the N.N.W., and as its rate increases it turns to the westward; when at its greatest strength it runs parallel with the coast, and towards the end of the tide its direction is W.S.W. and S.S.W.

PORT de DUNKERQUE, situated 10 miles to the eastward of Gravelines, is both a naval and commercial port, and the principal French port in the North Sea. The town stands at the junction of the Bergues, Bourbourg, and Furnes canals, and the public buildings are spacious, handsome, and regular; as this port serves as an outlet for the great manufacturing departement du Nord, the trade by sea is considerable, and

the cod and herring fisheries are carried on with great activity. The population in 1867 amounted to 33,000.

The port consists of an entrance channel leading to an outer tidal harbour, at the end of which is an inner tidal harbour and a floating basin. The inner harbour, together with the floating basin and the buildings around it, belong to the Government, and form what is called the Naval Arsenal.

Vessels drawing 19 feet can enter the port at high water during three or four days after full and change, and advance as far as the eastern jetty, where they can be lightened; if drawing 18 feet, they can proceed as far as the first stone quays, where the cargo can be discharged; and if of 17 feet draught, they can enter the floating basin. During three or four days after each quarter about 4 feet must be deducted from the above depths. When the extensive works now in progress (1879) are finished, there will be an augmentation of 3 feet to all the depths above mentioned. At low water there are only 3 feet at springs and 6 feet at neaps in the entrance channel.

Considered as a place of shelter, the port will admit vessels of about 16 or 17 feet draught at high-water ordinary springs, during strong winds between N.W., round westerly, and W.S.W.; 18 feet at equinoctial springs; and 12 feet at neaps. Northerly gales cause such a high sea outside the jetties that those of above 14 feet draught should not attempt to run in at that time without the pilots judge the entrance practicable; small vessels may enter at the top of high water by carrying all possible sail to get through the high sea, but the entrance is inaccessible during these gales at the neaps to all except coasters.

The Entrance Channel, which is about one mile long in a N.N.W. and S.S.E. direction, and 230 feet wide, is enclosed partly by the citadel quay and the extension of the town quay as far as the Cunette sluice, and partly between wooden jetties. The sand forces itself into the channel by the openings between the pilework and through the entrance, particularly during dry weather and at the neaps. A portion of water from the canals in the interior, as well as that from the ditches of the town, is used to scour out the harbour and the entrance channel, but although the stream is rapid, it has such a distance to run that its effect does not extend far beyond the jetty heads. During the rainy season, and at the melting of the snow, when the water in the interior is abundant, the stream runs strong out of the channel all the time the flood is weak, and is checked only when the tide rises rapidly; but it recovers its course as soon as the tide slackens, which is about half an hour before high water, and as soon as the ebb makes it acquires great speed. This stream is but little inconvenience to vessels of large draught entering before high water, but as

soon as the tide begins to fall they must have a strong fair wind to get through.

The entrance channel dries only within 2 cables of the outer harbour ; outside of this the depths in the channel vary from one to 8 feet in the furrows formed by the scouring water. From the Cunette sluice to the harbour, both sides of the channel are bordered by slopes of soft mud, upon which are placed vessels unable to find room in the harbour, or those which come to refit and can bear to lie aground. Quai Neuf between the sluice and the Belvédér rampart, is especially allotted to steam-vessels, and the berths of mud upon which they lie are 2 or 3 feet above the level of low-water great springs. The berths along the stockade opposite the quay are about the same height, and are also of soft mud. Vessels lying in this channel should be securely moored, for a strong northerly wind sends a swell in. With westerly winds those of about 15 feet draught lie aground on these berths for 5 or 6 days, but with those from the eastward they only remain a day or two at the utmost.

The Outer Harbour occupies the space between the town and the citadel, and is about 3 cables long, from 400 to 500 feet wide, and entirely surrounded with quays. It dries out at the springs, and the bottom for the most part is a mixture of sand, shingle, and mud ; towards the middle of the harbour it is covered with stinking black mud, broken tiles and bricks. Vessels lying alongside the quays ground upon a hard bottom, which at the foot of the citadel quay, on the north-west side of the harbour, is 3 to 4 feet above the level of the lowest tides ; at the foot of the Dutch and Holland quays it is obstructed by the ruins of old walls and piles covered with mud. When it blows strong from the northward the swell enters the harbour for about 2 or 3 hours each tide, but it does not inconvenience a vessel if she be well secured. There are careening and building slips at the upper end of the harbour, and strong cranes for masting.

The Inner Harbour, which communicates directly with the outer harbour, and dries out every tide, is nearly bordered throughout by an earth embankment. On its south side are three large building docks, and on its north side is the right wing of the storehouses surrounding the floating basin.

The Floating Basin, called also the Naval basin, occupies a space of 32,820 square yards, and communicates with the outer harbour by a wide flood gate, the sleepers of which are on a level with low-water great springs. All vessels that can enter the harbour can enter the basin, but those of heavy draught are obliged to wait for nearly the top of high water to go over a ridge of hard clay in front of the gate, 4 or 5 feet higher than the sleepers.

LIGHTS.—A handsome yellow brick tower, 177 feet high, in the form of a tall column, is erected on the shore between the west jetty and the ruins of Risban fort. It stands S. by E. $\frac{1}{2}$ E. 875 yards from the extremity of the west jetty, and exhibits, at 193 feet above high water, a *revolving* white light, of the first order, the *eclipses* of which succeed each other *every minute*, and the bright intervals are visible in clear weather at the distance of 25 miles; in ordinary weather the eclipses are not total within the distance of 12 miles, a faint light being seen between the bright intervals.

A *fixed* white light, of the fourth order, and elevated 85 feet above high water, is exhibited from the Heuguenar tower S. by E. $\frac{3}{4}$ E. 2,406 yards from the entrance. This light, specially intended for the channel between the tour de Heuguenar and the entrance of the jetties, shows its brightest light in that direction N. by W. $\frac{1}{2}$ W. and is visible 10 miles. To the right and to the left of this direction the light will only be seen in ordinary weather, from a distance of 5 or 6 miles, within an angular space of 10° or 12° .

A *fixed green* light is also shown from the extremity of the east pier at an elevation of 26 feet and is visible 3 miles.

From a white tower standing 40 feet within the West-moie head, at an elevation of 33 feet, is exhibited a tidal light, varying in colour and showing flashes to indicate the state of the tide. This light also indicates the height of the tide above low-water ordinary springs, and denotes every 10 inches of rise, when such height is $6\frac{1}{2}$ feet and upwards. When the tide is less than $6\frac{1}{2}$ feet above low-water and rising, the light will show *red*; when less than $6\frac{1}{2}$ feet and falling the light will show *green*. With the height of the tide $6\frac{1}{2}$ feet and upwards the light will show *white*, and be varied by a group of *coloured* flashes at intervals of *eighty seconds*, commencing when the rise is 7 feet 4 inches. The flashes in each of these groups will be shown at intervals of *five seconds*; each *red* flash adding 3 feet 4 inches to the initial height of $6\frac{1}{2}$ feet; and each *green* flash 10 inches. While the water is rising the light (whatever colour may be shown) will be eclipsed for a short period *every eighty seconds*; but when the water is at a standstill the light will not be eclipsed. When the light shows fixed *white* varied by groups of *coloured* flashes, the eclipses will take place about the middle of the interval separating the groups.

This light is visible in clear weather from a distance of 9 miles.

Fog Signal.—A bell is sounded in foggy weather.

Pilots.—The Dunkerque pilots are unable to get out of the harbour when there is a heavy sea at the entrance, which is frequently the case; but nine of them in their turn remain out during ten days in a large decked vessel, sloop-rigged. This vessel is generally at anchor in the West Pass near red buoy No. 2; she is not permitted to run into port

except during gales, and is provided with anchors and cables to assist vessels in distress.

A life boat is stationed at Dunkerque.

Directions.—When bound to Dunkerque from the westward with the wind between N.N.W., round westerly, and S.S.W. endeavour to make the land about cape Gris-Nez, and taking a departure from about 2 miles to the westward of that cape, steer N.E. by E. $\frac{3}{4}$ E. 12 miles, or until the western windmill at Coquelles bears S. $\frac{1}{2}$ W. or Mont Couple S.W. by S. From thence, the course to the Snouw light-vessel, moored at the entrance of the West Pass into Dunkerque road is E. by S., and the distance $16\frac{1}{2}$ miles, this passes about one third of a mile to the southward of the Dyck light-vessel.

In entering the West Pass, keep to the southward of the striped red and black bell buoy, and Snouw light-vessel, and then between the three black buoys which mark the northern, and the red buoys which mark the southern limit of the pass. Vessels of heavy draught running in with a strong westerly wind at low water should, in order to avoid the narrow spit with 17 to 19 feet on it, which extends nearly $1\frac{1}{2}$ miles to the westward of black buoy No. 5, keep about three cables to the northward of the red buoy No. 10 on the southern limit of the narrow. Large vessels, having to wait for high water to enter Dunkerque, anchor between the meridian of black buoy No. 7 and that of Petit Synthe church. The pilots always go out of the pass to meet large vessels; small vessels requiring one should make a signal as soon as they arrive in sight of the pilot vessel at anchor near red buoy No. 2.

At Night, if the wind be in the same direction, after running the above course N.E. by E. $\frac{3}{4}$ E. 12 miles from cape Gris-Nez, or until Calais light bears S.S.E. $\frac{1}{2}$ E. and cape Gris-Nez light S.W. by W., steer E. $\frac{3}{4}$ S. $11\frac{1}{2}$ miles up to the Dyck light-vessel, then bring the Snouw light-vessel to bear E. by S. $\frac{1}{2}$ S. and steer for her, and after passing close to the southward of her keep on the same course with the two light-vessels in line through Dunkerque road, and anchor in about 8 fathoms with Heuguenar tower light between the two jetty lights S.S.E.

With the wind between N.N.E. and E.N.E. long boards should be made in the Pas de Calais, until the town of Calais bears S.S.E. $\frac{1}{4}$ E., when a vessel may stand in for the land, keeping the lead quickly going to avoid crossing the Riden de Calais. Boards of about 3 miles long can be made between the West Dyck and the edge of the 5-fathom soundings, which borders the shore, but from the meridian of Gravelines lighthouse up to the entrance of the West Pass, short tacks should be made near the edge of these soundings, bearings of the Dyck and Snouw light-vessels enabling it to be done with great confidence.

From the Northward.—When bound from the North Sea to Dunkerque, or to the other French ports on this coast, endeavour to make the land about cape Blanc-Nez, whatever may be the direction of the wind or the time of tide. The land to the south-west of this cape, as far as cape Gris-Nez, may be seen in ordinary weather about 18 miles, and Mont Couple and the hills around it 22 or 23 miles. The course with easterly winds, from a position about 3 or 4 miles to the eastward of the Galloper light-vessel is S.S.W. $\frac{3}{4}$ W.; this will lead to the eastward of the Four-mile knolls, or North Falls Head, and when the North Foreland lighthouse bears W. by N. $\frac{3}{4}$ N. steer S.W. $\frac{1}{4}$ S. to pass midway between the North Falls Tail and the south-west end of the Sandettié bank. In clear weather there is no difficulty in turning to windward over this ground; when thick or foggy, the lead must be kept quickly going, so as not to stand into a less depth than 20 fathoms.

At Night the lights at the South Foreland, cape Gris-Nez, Calais, and even Dunkerque, may be seen in clear weather when a vessel is midway between the North Falls Tail and the south-west end of the Sandettié, and from this position, if the wind is from the eastward, Calais light may be steered for, or, if from the westward, the land between Calais and cape Gris-Nez; but to keep a safe distance from the coast, it will be necessary in the former case not to bring cape Gris-Nez light to the westward of S.W. by W. $\frac{1}{4}$ W., or Gravelines light to the eastward of S.E. by E. $\frac{1}{4}$ E., unless bound to Calais; and in the latter case not to bring cape Gris-Nez light to the westward of S.W. $\frac{3}{4}$ W., or Calais light to the eastward of S.E. by S. With strong northerly winds, it would not be prudent to approach within 5 miles of the coast, not bringing Gravelines light to the eastward of S.E. by E.

With strong westerly winds vessels sometimes keep to the westward of the Galloper and the Falls, to get smoother water. They pass either to the northward of the Galloper bank, or between that bank and the Four-mile knolls. The course from a position 2 miles to the westward of the Galloper is S.W. $\frac{3}{4}$ S., and after running about 35 miles in that direction the vessel will be 5 or 6 miles to the southward of the North Falls Tail, and cape Gris-Nez light, if the weather be clear, will be in sight.

From a well defined position ships may pass between the Great and Little banks of Out Ruytingen by steering for Gravelines on a S. by E. $\frac{1}{2}$ E. bearing; the Dyck light-vessel will then be just open eastward of this line, and the least water in this route will be $3\frac{1}{2}$ fathoms on crossing West Dyck bank. On reaching Dyck light-vessel steer for Snouw light-vessel as before directed, and proceed for Dunkerque roads. The same routes may be safely taken at night with the lights well defined.

Entering Dunkerque have good hawsers ready to moor head and stern, the anchors clear, and with a fair wind a heavy anchor to bring up by the stern. All possible sail should be carried to pass quickly through the breakers on the edge of the beach. Fresh northerly winds raise a heavy sea at the entrance, and the best time then for running in is at high water. When within the entrance channel there is no difficulty in reaching the harbour.

Strong winds between N.W., round westerly, and S.S.W., cause a heavy swell at the entrance. At this time keep close to the west jetty head and the western side of the channel until sheltered by that part of the jetty which is boarded up, as the flood stream crosses the open pilework, and runs with great rapidity upon the east jetty. This stream is at its greatest strength about half an hour before high water in the harbour. The most favourable time to enter, with moderate westerly winds, if a vessel's draught will permit, is when the stream slackens, or about half or three-quarters of an hour after high water in the harbour.

Strong easterly winds also raise a high sea at the entrance on a weather tide; with these winds steer for the east jetty head, and then run along the eastern side of the channel. The entrance is not accessible to sailing vessels when it blows strong between S.S.W. and S.S.E., but the sea is then smooth in the road, and they can remain there without danger. During calms or light winds every effort should be made to close with the west jetty head to avoid being drifted to the eastward of the entrance by the flood stream, which runs at its greatest strength outside the jetties the whole time that large vessels can enter. The best time for those of light draught to run in is, directly the signal is made that there is sufficient water, before the flood has attained its greatest strength.

Leaving Dunkerque.—Sailing vessels bound to the westward or the ports in the northern part of the North Sea generally wait for favourable winds and spring tides to quit the harbour. The gates of the floating basin are opened one hour before and closed about half an hour after high water. Winds with southing in them are the most favourable for leaving, but those that blow upon the coast, when they are strong, forbid any egress.

If bound to the westward, the harbour should be left directly they float, if the wind is sufficiently strong to stem the flood stream; but with a light wind they should not start until near the top of high water, and then anchor in the road for the stream to slacken. On quitting the West Pass steer for Dyck light-vessel, and thence a W. by N. course will lead northward of the Riden de Calais, and when Calais lighthouse bears S.E. $\frac{3}{4}$ S., or cape Gris-Nez lighthouse S.W. $\frac{3}{4}$ W., a S.W. by W. $\frac{3}{4}$ W. course will lead a safe distance to the westward of that cape.



If bound to the northward, and the vessel's draught will permit her to cross the banks northward of Dunkerque, the entrance channel should be left as early as possible before high water; but this passage should never be attempted without a fresh fair wind to enable her to run quick over the banks. When clear of the jetties, steer N. $\frac{1}{4}$ W. to get the spire at Petite Synthe in line with the guard-house which stands about a mile to the westward of Dunkerque lighthouse, bearing S.W. $\frac{3}{4}$ S.; then steer N.E. $\frac{3}{4}$ N., with the spire in one with the guard-house, crossing in succession the Braeck, the Smals, and the East Breedt banks, until the lead shows that the vessel is near the eastern edge of the East Dyck bank, when a N.E. by E. course for 35 miles will lead between Thornton ridge and Bligh bank. The soundings on this latter course will be from 14 to 19 fathoms. A cast of 9 or 10 fathoms may be had on the two narrow shoals lying between Thornton ridge and Bligh bank.

If the vessel's draught will not permit her to cross these banks, leave the harbour as soon as she floats, to benefit by the flood stream, which runs in the offing 3 hours after high water at Dunkerque, and when outside the jetties steer to enter Nieuport road by the Zuydcote pass. When clear of the Pass, steer E. by N. $\frac{3}{4}$ N. through the road until Furnes is in one with a high sand hill, flattened at the summit and free from verdure, named Broers Duyn (page 178), bearing S. $\frac{1}{4}$ W. when the vessel will be on the narrow shoal joining the Smals bank to the Nieuport banks. From this position a N.E. $\frac{1}{4}$ N. course for 35 miles will lead through the North channel, and clear of all the banks. The only inconvenience in following this course is crossing the stream in an oblique direction which must be allowed for. Ostende light may be seen in ordinary weather until within 2 miles of the southern part of Thornton ridge.

Tides and Tidal Signals.*—It is high water, full and change, at Dunkerque at 12h. 8m.; springs rise $16\frac{1}{2}$ feet, neaps $13\frac{1}{2}$ feet. Strong northerly winds raise the tide 2 or 3 feet higher, but the sea is then heavy at the entrance. The springs, when easterly winds prevail, do not rise much higher than the neaps with fresh westerly winds. In calm weather the tide remains slack in the harbour at high water about 15 minutes; 20 or 25 minutes with westerly winds; and 10 minutes with off-shore winds. A short distance outside the jetties the flood stream runs $2\frac{1}{2}$ or 3 hours after high water in the harbour.

The tidal signals used at this port are the same as those noticed in page 3. They are made from the flagstaff erected upon the terrace of an elegant little building, standing S.S.E. 109 yards from the lighthouse, between the west jetty and Risban fort.

ASPECT OF COAST.—The coast between Dunkerque and the frontier of Belgium, and even beyond the frontier as far as Blankenberg, an

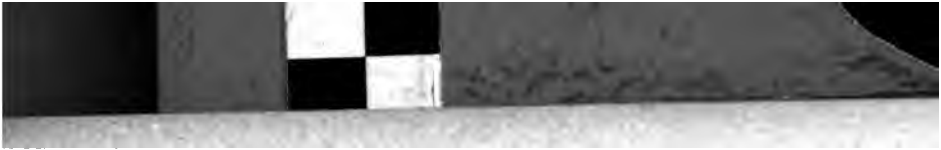
* For day tidal signals, see page 3, and for night tidal signals, see page 173.

extent of 83 miles, trends nearly in a straight line to the eastward. The shore being low and sandy, and bordered by sand-hills, has a dull uniform appearance, and the only objects that can be recognized on the level plain in the interior, are the clumps of trees surrounding the villages, the church-towers, and the windmills. Between Dunkerque and the frontier, which is 7 miles to the eastward, some revenue guard-houses, and a large beacon named the Pilot's mast, may be seen on the sand-hills near the shore, and an old ruined tower amongst the sand-hills near Zuydcoote; and beyond the frontier, the towers of Furnes, the ramparts and church tower of Newport, and a high sand-hill N. $\frac{1}{4}$ E. from Furnes, named the *Bruxs Duyn*, which is flattened at the summit and may be easily recognized at sea by its being totally free from verdure, whilst those near it are of a brown colour, being covered with bent grass.

The sandy beach bordering the coast dries out a quarter of a mile at low water, and the depths outside it increase gradually to $4\frac{1}{2}$ fathoms a mile from the shore. To ground in bad weather upon this part of the coast on a falling tide, would be less fatal than upon the beach between Dunkerque and Mardick, for whatever may be the violence of the wind and surf, if a vessel runs stem on to the beach she will make a bed in the sand, and the tide will soon leave her, especially if she takes the ground about half an hour after high water at the springs. Assistance can then be afforded to the crew, and they may be saved if they remain on board until the tide has left her; whereas a vessel to ground upon the high beach westward of Dunkerque would become a total wreck, often with the loss of the crew, at whatever time of tide she runs ashore.

Tides.—Upon the north coast of France, as well as upon the English shore from Dover to the North Foreland, the tide takes $5\frac{1}{4}$ hours to rise at springs from the level of low water to that of high water, and $7\frac{1}{4}$ hours to descend from that level to low water; but these durations vary according to the moon's age; that of the flood increases progressively from full and change to the following quarter, whilst that of the ebb decreases, so that two or three days after the quarter the duration of the ebb is as long as the flood; it then increases gradually until the following full and change, and that of the flood decreases. In calm weather both streams in the offing have respectively about the same duration as the rising and falling tide on the shore, and their rate is in proportion to the range of the tide. The flood stream is generally less rapid than the ebb, but the rate and duration of both are influenced by the winds.

It has not yet been ascertained by any decisive experiments whether the range of the tides between the north coast of France and the estuary of the Thames is equal to that observed on the surrounding shores. All that is positively known on the subject is, that as far as 15 or 16 miles



from the French coast the vertical motions of the tide seem to follow very nearly the same law as upon the shore, they take place at the same times, and they appear to rise in an equal degree; but if they rise of water at springs on this coast; at Calais for example, is compared with that observed at the same tides on the coasts of Holland and Belgium, as well as at several positions in the estuary of the Thames, and especially at Orfordness, it would appear that beyond the distance of 15 or 16 miles from the French coast, in a N.N.E. and E.N.E. direction, the range of tide decreases in the same manner as upon the shores. It is even probable that this decrease is very rapid, for in the middle of the North sea, between Holland and England, there are not more than 2 feet difference between high and low water; the mariner, therefore, in determining his position by the depths marked on the chart, will have to diminish the allowance required for the rise of tide, according to his distance from the nearest shore.

The tides upon the coasts of France, Belgium, and Holland, as well as upon the coast of England from Dover to the North Foreland, are produced by the tidal wave, which having traversed in about 8 hours the whole extent of the English channel, runs through Dover strait and spreads into the North sea. The flood stream, when at its greatest strength, takes an E.N.E. course, and its direction is only changed near the shore by the bends of the coast.

The tides upon the English coast to the northward of the North Foreland are produced by a similar tidal wave, which after having doubled the British islands to the north, extends to the southward along the eastern coasts of Scotland and England, and runs directly towards the estuary of the Thames. The flood stream, when at its greatest strength, runs parallel with the English coast, but when it has reached the parallel of Orfordness, and the Thames opens out, it turns to the W.S.W. in an opposite direction to that which the flood stream follows near the coast of France. But as the changes in the tides in the offing occur later than the times of high and low water on the shore in proportion as the positions where they take place are distant from the land, the stream of flood on the French coast is evidently mixed in the neighbourhood of the Gabbard and Galloper banks with the ebb stream which runs out of the mouth of the Thames.

CAUTION.—Mariners should bear in mind that the streams in the offing in the North-sea as well as in the Channel, are not signs to indicate the rise and fall of the tide as they are upon the shore; for a vessel would be exposed to the greatest danger if she ran with the stream of flood towards a shoal lying far from the land, under the idea that in consequence of the direction of the stream the water was still rising upon the shoal, and

that she might venture to cross it. The flood stream only ceases to be felt in the vicinity of some of those banks which lie the farthest out from the coasts of France and Belgium, when it is nearly low water on the shore. When desirous of crossing a bank lying within 15 or 16 miles of the French coast, an approximate calculation should always be made of the number of feet the tide has risen above the soundings marked on the chart.

TABLE giving the Direction and Rate of the Tidal streams during
Ordinary springs in the southern part of the North sea.

Positions.	Tidal Stream.	Time with reference to High Water at Calais.	Direction.	Rate.	Duration.
		h. m.		Knots.	h. m.
N.N.E., 1½ miles from Cape Gris-Nez.	Flood - - -	0 40 after	N.E. by N. -	4'0	9 0
	End of flood - -	3 0 "	N.N.E. -	1'5	-
	Ebb - - -	3 20 "	North -	0'9	-
	End of ebb - -	6 20 "	West -	3'8	1 30
E. by S., 5½ miles from South Fore-land.	Flood - - -	-	E.N.E. -	-	-
	End of flood - -	5 0 after	-	-	-
	Ebb - - -	-	W.S.W. -	-	-
	End of Ebb - -	2 0 before	-	-	-
N.N.W., 1½ miles from Cape Blanc-Nez.	Ebb - - -	4 30 before	W.S.W. and West.	4'5	1 3
N.W. by W., about 3 miles from entrance to Calais.	Flood - - -	1 30 before	East -	2'4	3 0
	End of flood - -	0 30 after	-	3'5	-
	Ebb - - -	3 30 "	W. by N. -	2'7	-
	End of ebb - -	5 0 before	West -	4'0	-
N.E. ½ E., 5 miles from Calais lighthouse.	Flood - - -	2 30 "	-	-	-
	End of flood - -	0 20 after	E. by N. -	4'0	3 30
	Ebb - - -	5 40 "	-	-	-
	End of ebb - -	-	West -	3'8	-
N.E., 14½ miles from Calais lighthouse.	Flood - - -	0 45 after	E.N.E. -	2'4	-
	End of flood - -	2 10 "	N.E. -	3'0	-
	Ebb - - -	4 0 "	N.N.W. -	1'2	-
	End of ebb - -	5 10 "	W. by S. -	3'6	2 30
N.E. ½ N., 20 miles from Dunkerque lighthouse.	Flood - - -	3 30 before	S.S.E. -	-	-
	End of flood - -	1 20 "	-	-	-
	Ebb - - -	2 20 after	E. by N. -	3'0	-
	End of ebb - -	5 30 "	W. by S. -	2'7	-
In Dunkerque road, N.W., 3½ miles from Dunkerque lighthouse.	Flood - - -	4 0 before	-	-	-
	End of flood - -	0 40 "	-	-	-
	Ebb - - -	2 20 after	E. by S. -	2'5	-
	End of ebb - -	5 30 "	East -	3'5	2 0
In Dunkerque road, one mile to the northward of Dunkerque west jetty head.	Flood - - -	3 20 "	N.W. -	3'0	2 30
	End of flood - -	6 30 "	-	-	-
	Ebb - - -	3 0 before	-	-	-
	End of ebb - -	-	-	-	-
In the Zuydcoote Pass - -	Flood - - -	0 30 after	East -	3'5	2 0
	End of flood - -	2 20 "	-	2'0	-
	Ebb - - -	3 20 "	W.N.W. -	3'0	2 30
	End of ebb - -	5 30 before	-	-	-
N. by E. ½ E., 25 miles from Calais lighthouse.	Flood - - -	2 0 "	-	-	-
	End of flood - -	0 20 before	East -	3'0	-
	Ebb - - -	0 45 after	E.N.E. & E. -	3'5	2 30
	End of ebb - -	1 40 "	East -	2'0	-
N.N.E. ½ E., 45 miles from Calais lighthouse.*	Flood - - -	3 40 "	-	-	-
	End of flood - -	5 0 before	W. by N. -	1'5	-
	Ebb - - -	5 20 "	West -	3'0	-
	End of ebb - -	2 10 "	-	-	-
	Flood - - -	2 20 after	E.N.E. -	3'4	-
	End of flood - -	5 30 "	W.S.W. -	3'2	-
	Ebb - - -	3 20 before	-	-	-
	End of ebb - -	0 43 "	-	-	-
	Ebb - - -	2 30 after	E.N.E. -	2'7	-
	End of ebb - -	5 30 "	-	-	-
	Flood - - -	3 10 before	W.S.W. -	2'7	-
	End of flood - -	0 30 "	-	-	-

* In this position, and to the northward of it, the north-eastern stream is the ebb, and the south-western the flood.

GENERAL REMARKS.—Though a taken from south to north, would decline nearly in highest part of which would be the southern shore, would decline in a contrary direction, or from no distinguishing features do not so immediately manifesting these islands from the westward. Seen from at any considerable distance, both Guernsey and Jersey low land of Braye du Valle in the former island, and in the latter, being yet in the horizon. The outline is somewhat more irregular than that of Jersey; the former is also clothed with more verdure than that of a deeper shade. St. Ouen bay, in Jersey, has suffered the encroachments of the sea-sand; so much so, the western land between La Corbière point and L'Etacq with it.*

ASPECT of GUERNSEY.—The most remarkable first present themselves when running for the south-west are the light-tower on the Hanois rocks, the white castle Grey in the centre of the sandy bay of Rocquain house, Torteval church spire, and the tower of L'Etacq at the northern part of the above bay, near Lihou guard-house is on the heights to the southward of apex of the bluff. Torteval church, with its round tower by a high steeple, stands at a little distance inland; in this quarter of the island —

gradually to rise from the horizon ; presenting a surface diversified with houses, churches, windmills, and groups of trees ; and which are still more conspicuous if seen from a north-westerly position.

All the western shore of Guernsey is studded with precipitous rocks, many of which are wholly detached from the land. On the high land above St. Martin point, at the south-east end of the island, a stone column, 96 feet high, having its apex 424 feet above the level of low water, ordinary springs, has been erected, in honour of Lient.-General Sir John Doyle. Another remarkable, as well as beautiful object, is the Victoria tower (100 feet high, and 322 feet above low water), erected on the heights above the town of St. Peter port ; to commemorate the visit of Her Majesty the Queen in 1846. It is a square tower, slightly tapering from its base, surmounted by a battlemented gallery, with square turrets at its angles.

ASPECT of JERSEY.—The approach to Jersey from the westward is marked nearly in a similar manner to that of Guernsey. The first objects seen are the churches of St. Peter and St. Ouen ; St. Ouen windmill with an extensive range of buildings on the sandy heights, called St. Ouen barracks ; and now and then the turret of St. Mary church together with that of Princes tower or Hougue Bie, will appear from among the trees in the interior of the island. St. Peter and St. Ouen churches stand high : the steeple of the former is lofty, that of the latter merely a turret. On a nearer view the six martello towers on the sandy beach in St. Ouen bay will present themselves, and also the Corbière rock, with the declining land to the south-eastward ; the surface of which latter is covered with wood, and its base with sand and rock.

Such are the features which characterize Guernsey and Jersey, nor can they be mistaken even by a stranger. In clear weather these islands may be seen from a distance of 25 miles.

REFRACTION.—To show the strange effects of refraction, it may be noticed, that from a station near Verclut guard-house in Jersey, the top of the south-eastern battlement of Seymour tower exactly coincides with the line of the visible horizon at low water equinoctial spring tides ; sometimes, however, when viewed from the same position, it has appeared considerably below that line, and in several instances above it. In this case the line of sight passes partially over the surface of the rocky ledge called the Violet bank, and over the sandy strand in its vicinity, as well as over the sea, and is at a mean height of 64 feet above it. Similar variations in the refraction have been observed on the French coast, between the steeple of Coutances and the summit of the trees in that neighbourhood, and also in the vicinity of Cancale.

As there is much low land about this part of the coast, and extensive outlying reefs which dry at low water, these occasional changes in the appearance of objects must be considered and allowed for.

WINDS and WEATHER.—The prevailing winds among the Channel islands in the winter are those between S.S.E., rounded by the south and W.N.W. ; the latter, however, is most predominant : and it is fortunate that against the occasional furious effects of this wind Guernsey and Jersey should offer such good security for shipping. During the summer months, vernal and autumnal equinoxes, the winds appear variable and uncertain.

There is an opinion that easterly winds last longer when they set in, and set in with more uniformity in this neighbourhood than has been observed elsewhere during the winter season. Southerly and south-westerly winds during that period are almost universally accompanied with or followed by stormy weather, which seldom or ever clears up until the wind changes to the north-west, as it almost invariably does.

The state of the weather, as well as the direction and force of the wind, in the vicinity of Alderney, does not always correspond with that at Guernsey and Jersey ; being frequently local or peculiar to itself ; owing perhaps to the island being in the immediate vortex of the tides, which are in a constant state of rotation : and this more particularly during the new and full moon. At those periods, a difference of four points has been experienced ; viz., the wind from E. by N. at Guernsey and Serk, and from N.E. by N. at Alderney, both blowing at the same time on a South-western tide, lightly or moderately in the neighbourhood of the former, while vessels near the latter were under double-reefed sails.

Upon a north-eastern stream the wind has often been found S.W. by W. at Alderney, while at Herm it blew West, with similar variety in strength ; and this without any perceptible cause (the attraction of the tides excepted) or any difference in the barometer at the two places. The southerly, south-easterly, northerly, and north-easterly winds, also invariably blow from Alderney in strong irregular gusts ; more particularly the first and last.

Gales of wind from S.W. and N.W. send in the heaviest sea amongst the islands, to which the strength of the tides greatly contribute ; the worst period is from half flood to half ebb, after which the westerly stream keeps much of the sea out in the offing.

THE APPROACHES to the Channel islands present peculiar difficulties to the stranger. The outlying rocks fronting their coasts ; the strength and ever varying direction of the tidal stream, and the rough sea occasioned by it in bad weather are all elements of danger ; nevertheless

most of these difficulties may be overcome by the skilful seaman, assisted by a careful study of the charts and sailing directions.

SOUNDINGS.—Near the coasts of the Channel islands and between them there is nothing remarkable in the soundings, either in depth or quality of the ground, to assist the mariner uncertain of his position. But to vessels approaching from the westward in thick weather it may be useful to note the following facts; namely,—That nothing less than 35 fathoms (at low water) will be obtained in the offing outside (or westward of) the Roches Douvres, and Guernsey; nor less than 33 fathoms between Guernsey and the Casquets; excepting on some of the very small gravel knolls near Hurd Deep, where as little as 20 fathoms may perhaps be found; such knolls, however, may be easily distinguished from the large banks near and amongst the islands, by their very inferior size, as well as the greater depths by which they are surrounded.

An increase of depth from 40 to 50 and 60 fathoms would indicate a position N.W. of Guernsey, somewhere near the west end of Hurd Deep, and if between 70 and 100 fathoms such depth could only be obtained north of the Casquets and Alderney, near the east end of the Deep. The bottom of Hurd Deep is remarkable for large patches of black mud, although there is also much rocky ground there, and other substances. Between the Deep and the islands, as well as amongst them, the ground is all much of the same character; consisting of rock, gravel, granitic sand, and coarse ground; excepting near the banks, round the bases of which it is all fine sand.

Within the Channel islands, from Alderney down to Jersey, the soundings are a safe guide, in approaching the French coast to within a reasonable distance. A line drawn from the east end of one to the other of those islands would be nearly parallel to the French coast, and distant from it about 9 miles; at the north part of this line near Alderney there is 25 fathoms over clean ground, and to the southward near Jersey 20 fathoms with coarse rotten ground, and occasionally oyster beds. Within this line the water shoals very gradually towards the coast. Southward of Jersey the numerous reefs render all approach to the coast by a stranger very hazardous.

Heavy gales of wind are found to cause very considerable alterations in the appearance of outlying sand-banks, as well as of the exposed beaches of the islands; south-westerly gales sending in and heaping up large quantities of sand and shingle, and those from north-east washing them away. It is well known that the Château and Ecrevière banks (eastward of Jersey) vary as much as 6 feet in height from this cause; and it is probable, therefore, that the Banc la Schole, the Casquets, and other banks, also vary from similar causes.

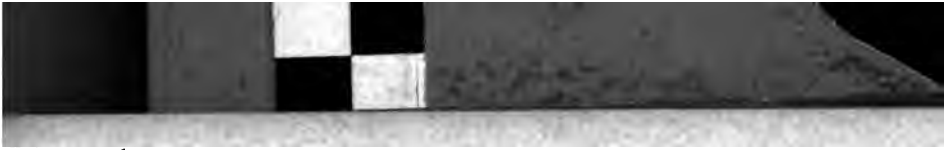
All these variable banks, however, consist of fine sand and gravel, having sharp ridgy apexes, and are not, therefore, very dangerous to shipping, only for the confused sea occasioned by the tide rippling over them in bad weather.

Tides.—Near Guernsey, and northward of that island, the true Channel stream prevails; the great body of the flood running about E. by N. whilst the tide is rising at Dover, and the ebb W.S.W. when it is falling at that place; but near the Roches Douvres, and to the eastward, the flood stream sets S.E. into the gulf of St. Malo, and the ebb N.W. out of it; the change in the latter section of the stream taking place an hour after high and low water by the shore respectively, and near the time of half flood and half ebb at Dover.

Thus what is called tide and half tide prevails at Guernsey and amongst the islands to the N.E., whilst at Jersey, and along the southern shore of the gulf, as well as out to the westward near the Roches Douvres, the stream is more regular; the former resulting from the direct action of the channel stream, the latter from an interruption of the southern portion of that stream by the coast of France, and its diversion into the gulf of St. Malo.

The centre of the Deroute channel, between the Roches Douvres and Guernsey, may be considered to mark the separating boundary of these two streams, for along this line and to the eastward they successively run side by side together, blend, and separate, in alternating direction and force, depending on the state of tide. It should here be noted that the tidal stream around and between the Channel islands has a rotary motion (caused by the differences in the action of the stream above described, and the peculiar form of the shores of the gulf,) from right to left; going right round the compass in little more than 12 hours, an ebb and a flood. It is also worthy of remark that, in consequence of these differences, the action of the streams near the northern part of the gulf, north of cape La Hague and Alderney, and along its southern shore, out to the Roches Douvres, are nearly the reverse of each other; there being slack tide at one of these places when the stream is running at its maximum rate at the other, and vice versâ.

About the time of half ebb at Dover and first quarter flood by the shore at Guernsey, the stream sets sharply into the gulf on both sides and continues to run in, south-eastward, until half-flood by the shore and slack and change of stream in the offing, both of which occur nearly simultaneously with low water at Dover. A division of the Deroute stream now takes place; the northern part sweeping to the E.N.E. through the Russel, Swinge, and Race channels, and then uniting with the east going Channel stream, northward of Alderney; the southern part



near the Roches Douvres setting into the depth of the gulf to the S.E. past Jersey and the Minquiers, until near high water by the shore; after which, although the main body of the stream to the southward slack, its northern border turns off past Jersey to the north-eastward and into the Deroute stream.

The ebb stream begins to run out to the westward close in along the southern shore of the gulf soon after high water; out in the Channel within the Roches Douvres an hour later; at a position 8 miles N.W. of the Roches Douvres the stream changes at 2 hours ebb; and farther to the northward near Guernsey, as already noticed, the slack and change of stream takes place soon after half ebb by the shore, at which period the Westerly stream also makes down through the Race, Swinge, and Russel channels.

It is high water, full and change, at St. Helier, Jersey, at 6h. 29m. mean spring range $31\frac{1}{2}$ feet; at Guernsey, 6h. 37m. mean spring range 26 feet; and at Alderney, 6h. 46m., mean spring range $17\frac{1}{2}$ feet.* Out in the offing westward of Guernsey the stream seldom exceeds 3 knots, until the island is approached, near which it sometimes attains the rate of $4\frac{1}{2}$ knots. In the Russel channels it exceeds 5 knots, and it runs about the same rate between Jersey and the Minquiers, and nearly 4 knots in the centre of the Deroute channel between Jersey and Serk. The Race and Swinge streams sometimes attain the rate or more than 7 knots.

The rapidity with which the tides rise and fall, and their velocity, are greatly influenced by strong north-eastern and south-western gales of wind; the former retarding and the latter accelerating their progress in a very remarkable degree; the latter will also cause the Race stream to run three-quarters of an hour longer to the north-eastward than it otherwise would do, though the former has not a similar effect upon the stream when running to the south-westward.

The tides put in and take off in all this neighbourhood very suddenly, and the general run of the springs takes place about half an hour earlier than the neaps.

Caution.—A constant and careful allowance should always be made for the set of the stream. If approaching from the westward, and to the southward of Alderney a south-easterly set may certainly be expected, which will increase in intensity on nearing Guernsey; and between that island and the Roches Douvres a considerable indraught is always found, especially in N.W. gales.

If a vessel should happen to be near the islands during a long winter's night, but to the westward withal, the following observations may be

* The average duration of the flood stream is $5\frac{3}{4}$ hours, and of the ebb $6\frac{1}{2}$ hours.

worth consideration. With northerly, north-westerly, and westerly winds, it would not be prudent to lay her head to the north-eastward, between the periods of low water and half-flood, unless the depth of water exceeds 31 fathoms, because during that interval the wind and tide unite in driving the ship to the south-eastward. It is equally imprudent with southerly, south-westerly, and westerly winds, to lay a vessel's head to the south-eastward between half-flood and high water for the same reason, the wind and tide contributing to drive her to the north-eastward.

With all easterly winds the islands become a weather shore, and may consequently be made free with as discretion may point out. Further: a position or departure taken before dark may, by attention to the set of the streams, be preserved within 3 or 4 miles, provided a vessel can carry close-reefed top-sails and fore-sail, as what may be lost on one tide will be nearly regained on the next, if the wind will enable her to lie across either. This calculation may be made with a degree of certainty off St. Malo, Granville, and cape Flamanville

When making the Casquets or any of the rocks or islands in thick foggy weather, never run close home with the stream, but wait until the turning of the stream would set you off shore in the event of getting into danger suddenly.

In westerly gales always avoid passing close to windward of any of the banks on a weather tide; and it will be as well to remember, that on such occasions, whilst the western stream is running in the offing, there is a very heavy sea to the westward of the islands and comparatively smooth water within them, and along the coast of France; so that a small vessel leaving Alderney at 2 hours ebb, and pushing through the Race before the W.S.W. stream makes down, could run a considerable distance towards Jersey in smooth water.

On entering or leaving any of the narrow channels between the islands be careful to make early allowance for the different sets of tide, sure to be met with at such places.

GUERNSEY.—The island of Guernsey is nearly in the form of a right-angled triangle, the north-west side forming the hypothenuse, the length of which is about 8 miles. The land on the south side is comparatively high and steep, its general elevation being about 300 feet, (the highest part of the island is Hautnez, over Icart bay, which is 363 feet above the level of low water,) but it gradually lowers towards the north, where in some places it is little above the sea. The island is encompassed with many dangerous rocks, the principal of which are the Hanois, Sambule, and Grunes, on the west and north-west sides; the Braye rocks with several others on the north side; and on the north-east and east sides lie the

Amfroque rocks, together with the islands of Herm and Jethou, which are also surrounded by numerous rocks and ledges.

Guernsey contains 16,000 acres of land, which is fertile and highly cultivated, but having a population (in 1871) of 30,667, it does not grow grain enough, nor raise sufficient number of cattle to supply its inhabitants.

ST. PETER PORT, the capital of the island, stands on the eastern shore and in 1870 its population numbered about 16,000. From the sea it has rather an imposing appearance, but is irregularly built. It is the seat of government of the northern division of the Channel islands, or Bailiwick as it is termed; which includes Alderney, Serk, Herm, and Jethou. Its small tidal harbour, carrying a depth of 20 feet alongside quays at high-water springs, and 10 feet at neaps, is now enclosed by a new harbour formed between two breakwaters, with an average depth in it of 10 feet at low water of mean springs.

The principal articles of export are cider, apples, potatoes, wines, and building stone, and granite in a broken state for the repair of roads. The imports are British manufactures, wine, sugar, coffee, grain, and cattle; the two latter are chiefly from France. In the year 1862 the number of vessels belonging to the port was 128, their total registered tonnage 19,679 tons, and they were manned by 1,053 seamen. At the same period 2,261 vessels, of 256,290 tonnage, entered inwards, and 2,185 of 254,288 tonnage, cleared outwards.

Supplies.—Though Guernsey abounds with springs, the only accessible watering place for vessels has hitherto been on its eastern side, at Fermain bay, about a mile northward of St. Martin point; where, with the wind from N.N.E., round westerly to S.W., boats provided with long hoses may fill at pleasure almost any quantity. Pipes are now laid down from the large reservoir at Havelet to the harbours; where water is applied at a shilling the ton. St. Peter Port market furnishes fresh meat, fish, vegetables, and fruit in abundance at a cheap rate.

ST. PETER PORT HARBOURS.—The small tidal harbour of St. Peter Port, $4\frac{1}{2}$ acres in area, is enclosed by piers of masonry 35 feet high, with an entrance 80 feet wide, facing the east. The depth at high water springs between the pier heads is $24\frac{1}{2}$ feet, and $14\frac{1}{2}$ feet at neaps; the average depth along the quays on the same tides being respectively 20 and 10 feet. To the south-eastward of the harbour stands castle Cornet, which is now connected with the mainland by a massive granite causeway.

The new harbour works comprise two esplanades, one on each side of the old harbour, running parallel with the sea front of the town, and averaging together 2,500 feet in length and 150 in breadth. From these esplanades extend two breakwaters, one on either side, and equi-distant



from the old harbour ; being 2,500 feet apart at the base, and projecting to the eastward, so as to enclose the natural sandy bay in front of the town.

The south or Castle breakwater is carried across the rocky isthmus, by which, at low water springs, castle Cornet is connected with the main, and terminates at the north-west bastion of the castle, being 1,900 feet in length. The southern face of this breakwater consists of an upright wall and parapet, constructed of rough masonry, and carried to a height of 15 feet above the highest tides. Along this is constructed a level roadway and footpath 40 feet wide. On the north side and under the lee of this arm it is proposed to construct a floating dock. Farther, on this side, a rough stone breakwater projects 600 feet eastward from the north-east salient angle of castle Cornet ; its end marked by a handsome stone building, from which is exhibited a powerful white light. These works effectually screen the entrance of the harbour from the most exposed quarter, the southward, and add greatly to the security of the anchorage in the road.

The north, or St. Julien's breakwater and landing pier, begins on the north side of the old harbour, at the extremity of the new esplanade, and extends in an easterly direction about 1,400 feet, or as far as the head of the Blanche rock ; whence it changes to a southerly direction, or a little outside the line of castle Cornet, for nearly 900 feet, leaving an entrance between the pier end and the rocks off castle Cornet of only 370 feet in width, and completely sheltering the pool within. Within and alongside the outer part of this pier are three capital landing stages for steamers, having 9, 8, and 3 feet respectively at the lowest spring tides, at which period there is 10 feet at the entrance, near the end of the pier, and 6 feet near the middle of the pool within. From the middle of the pool the water shoals gradually and regularly towards the shore. The bottom of the harbour is nearly altogether fine sand.*

The whole space enclosed by the works above described, exclusive of the areas of floating dock, old harbour, carenage, &c., amounts to about 57 acres, of which, however, only about 23 acres are covered with water at the lowest tides.

ST. PETER PORT ROAD is in front of the town, and to the north-eastward of castle Cornet. The ground is excellent for holding, and the road affords good shelter against all winds, except those from between S.S.W. and S.E., which send in much swell and sea, especially on the ebb tide. Under such circumstances it is highly probable that smoother water will be found under the lee of the Great bank, where a vessel will

* The depths as well as heights, &c., appearing in this Chapter, and the Admiralty chart of Guernsey generally, are reckoned from a zero near mean springs. The lowest tide registered at Guernsey from 1858 to 1868 fell 3 feet 9 inches below that zero.



be much safer than in the road, as in the event of parting from her anchors she might easily run through the Little Russel and anchor off fort Doyle, or in L'Ancrese bay.

A vessel should moor in St. Peter Port road, with open lawse, to the S. by E., and within the following limits:—southern limit, St. Peter Port church in line with the end of the breakwater off castle Cornet; northern limit, the beacon on the Sardrette rock and Victoria tower in line; western limit, the outer angle of castle Cornet in one with the white beacon on Fermain point; and eastern limit, the Anfré beacon in line with left extreme of buildings on high land over St. Martin point. Here there are from 5 to 11 fathoms water, fine sand; but farther southward the bottom is coarse, and the depth increases to 20 fathoms. There is a government mooring $2\frac{1}{2}$ inch chain laid down in 5 fathoms, at the distance of about a cable north-eastward of castle Cornet breakwater lighthouse.

LIGHTS.—Hanois light.—The light tower on the south-western rock of the Hanois group, one mile off the west end of Guernsey, exhibits, at 100 feet above the level of high water, a *revolving red* light of the first order, which attains its greatest brilliancy *every forty-five seconds*, and should be seen in clear weather from a distance of 12 miles. The light is visible all round the western horizon, and obscured only to the eastward by the island of Guernsey, between the bearings of W. by S. (through west) to N.W.; the line of eclipse in this latter direction passes $3\frac{1}{2}$ miles south-westward of L'Etac de Serk, and over the Pierres de Lecq rocks. The light tower is of gray granite, and 117 feet high from base to vane; the Casquets bear from it N.E. by E. distant $21\frac{1}{2}$ miles; the Corbière rock, Jersey, S.S.E. $\frac{1}{2}$ E., $23\frac{1}{2}$ miles; and the Roches Douvres, S.W. $\frac{3}{4}$ S., 20 miles.

Fog signal.—A bell is sounded in thick or foggy weather, *every fifteen seconds* from Hanois lighthouse.

St. Peter Port lights.—On the outer or eastern extreme of castle Cornet breakwater, at the south side of entrance to the outer harbour of St. Peter Port, is a *fixed* white light at an elevation of 46 feet above high water, and visible from a distance of 9 miles. It shows as a *bright* light from north round by east to south, and as a *dim* light landward, from south round by west to north. From the lighthouse the Longue Pierre rock off St. Martin point bears S.S.W. distant 2 miles nearly; Lower Heads rocks buoy S.E. by S. $2\frac{1}{8}$ miles; Rousse rock E. by N. $\frac{3}{4}$ N. $2\frac{1}{2}$ miles; Platte rock N.E. by E. northerly $2\frac{1}{8}$ miles; and the Roustel rock N.E. by E. $\frac{1}{2}$ E. $2\frac{1}{2}$ miles.

A *fixed red* light is exhibited from a wooden building, painted white, on the south pier-head of the old harbour of St. Peter port, for the convenience of vessels approaching the roadstead or harbour. The light is



elevated 34 feet above high water, and may be seen when coming through the Little Russel from the northward, the Great Russel from the eastward, and also from the southward when St. Martin point is rounded.

From the extremity of the northern jetty, a *fixed green* light is exhibited.

Caution.—Vessels bound to Guernsey from the westward should not approach the island in thick weather within the depth of 40 or 38 fathoms, unless their position has been previously well ascertained. Careful allowance should also be made for the flood stream setting in for the island.

The water is deep at a quarter of a mile westward of the Hanois lighthouse, but dangerous rocks extend to the S.S.W. for a third of a mile; to the N.N.W. three-quarters of a mile, and to the northward one mile from the lighthouse. The Grune de l'Ouest, or du Nord-Ouai, a rock that dries 10 feet at low water springs and which has hitherto been considered the northernmost danger off Guernsey, bears N.E. $\frac{3}{4}$ E., nearly 5 miles from the lighthouse; but as several dangerous sunken rocks have been discovered outside it, the western of which, the Boue Blondel, has only 5 fathoms on it, and bears from the lighthouse N.N.E. $3\frac{1}{2}$ miles, it is recommended that, to clear all these dangers, vessels from the south and west passing westward of Guernsey at night, should not bring the Hanois light westward of South until the Casquets light bears E.N.E.

Anchorage.—There are several anchorages on the south side of Guernsey, where, with the wind off the land, a vessel may stop a tide; but as they would not be safe for a stranger to approach, a vessel not having a pilot should not close the coast so as to shut in the north point of Serk with Jerbourg bluff.

St. Peter Port road, as already noticed, affords good shelter, except with the wind between S.S.W. and S.E., and the anchorage is excellent.

There is good anchorage at the north end of the Great bank, on the east side of the island, as well as in Petit Port, on the south coast; also on the north coast off Fort Doyle, and L'Ancrese, Grand Havre, Cobo and Vazon bays; but at most of these places it would be necessary to employ a pilot. Rocquaine and Perelle bays are very dangerous, and, together with the intermediate coast, quite unfit for any but the smallest vessels to approach.

Pilotage.—By ordinance of the Royal Court of Guernsey it is enacted, that every pilot boat shall carry a flag, half red and half white, the white part being placed uppermost; the letter P shall be marked in black on the white part, and the pilots number in white on the red parts near the centre of the flag:—the whole under the penalty of a fine, at the



discretion of the court. And that every ship or vessel of above 50 tons burthen, new admeasurement, shall be bound to take a pilot, both on her arrival in this island and on her departure, on pain of paying the usual pilotage to the pilot who shall first have presented himself for the purpose of undertaking the conduct or pilotage thereof.

Steam vessels and yachts are excepted, also ships or vessels putting into the roads in consequence of stress of weather or contrary winds, and putting to sea again; provided they do not load or unload either merchandise or ballast. In case of a pilot being prevented by tempestuous weather from getting on board a ship or vessel at sea, such ship or vessel and the pilot boat shall so manage as to enable the pilot boat to take the lead and serve as a guide; and such ship or vessel shall pay the same pilotage as if the pilot had actually gone on board.

Rates of Pilotage.

	Vessels above 50 tons burthen and under 80 tons.	Vessels of 80 tons and up to 100 tons.	Vessels of 100 tons and up to 250 tons.	Vessels of 250 tons and upwards.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.
To the pilot who shall have brought a vessel from sea into the roads.	0 10 6	1 0 0	1 5 0	1 10 0
To the pilot of the harbour of St. Peter Port, for bringing a vessel into the said harbour.	0 7 0	0 10 0	0 15 0	1 0 0
	0 17 6	1 10 0	2 0 0	2 10 0

Tidal Streams.—It is high water, full and change, in St. Peter Port harbour at 6h. 37m.; equinoctial springs rise 33 feet, ordinary springs 26 feet, neaps 18½ feet, and neaps range 11½ ft. The general level of the sea is liable to be depressed or elevated, between 2 and 3 feet, by strong easterly or westerly winds.

The eastern stream or flood makes close in shore, along the south and north-western coast of Guernsey, soon after low water; whilst the south-western stream is still running at its strength in the offing 4 miles westward of the island; between these positions the streams vary in strength and direction as one or the other is approached.

The flood stream between Guernsey and the rocks projecting from the south-west end of Jethou island, takes two different directions; one part runs directly through the Great road and thence into the Little Russel; another branches off nearly at right angles from the former and runs to



the eastward, towards Jethou, and through the before-mentioned rocks into the Great Russel. The ebb stream runs directly the reverse; the stream from the Great Russel uniting with that in the road, after it has passed the rocks at Jethou, whence they both set to the south-westward. By bringing the Grande Braye rock a boat's length open westward of Brehon tower, a vessel will keep in the former draught, or road-tide, and the said rock, if brought in one with Brehon tower, will place her in the latter, or indraught of the Great Russel. A vessel working into Guernsey road from the southward will derive great advantage by paying attention to this division of the stream.

It is high water in the Great and Little Russel channels at the same time as at St. Peter Port, and the streams run nearly $5\frac{1}{2}$ hours on each tide, allowing better than half an hour for high and low water slack. In the Great Russel the strength of the flood stream runs E.N.E., and the ebb W.S.W., and in the Little Russel the strength of the flood runs N.E. $\frac{1}{2}$ E., and the ebb S.W. $\frac{1}{2}$ W., nearly. At the north-eastern entrance, however, of the Little Russel, between the Braye and the Amfroque rocks, the stream takes the direction of that in the offing, viz., the first two hours of the flood sets directly for the north end of Herm island, gradually joining the south-western stream in the Russel, and the last hour of the flood as well as the first of the ebb.

To understand the various sets of the tides in the Russel channels, as well as all round the outer shores of this group of islands, it is necessary to refer to their governing cause, namely, the rotary motion of the offing stream, which in one tide runs in regular succession from every point of the compass.

At high water, by the shore, the flood stream sets E.N.E. fairly through the Russel channels, and is then at its greatest strength, coinciding nearly with the general direction of the offing stream, which at this time, to the westward of Guernsey, is running E. by N., and to the eastward of Serk N.N.E. The direction of the offing stream in its progressive change from North to West, &c., sets about N.W. by N., 3 hours after high water, or at half ebb, which a glance at the chart will show to be right across the Russel channels; producing, as might be expected, a slack tide in the Great Russel, under the lee of Serk, and especially in the Little Russel, protected as it is by Herm and Jethou and the numerous rocks to the northward and southward of those islands. At low water, the offing stream has got round to W.S.W., and as this is about the direction of the Russel channels, the ebb stream, at this time, attains its greatest strength.

After low water the island of Guernsey begins to obstruct the free course of the stream into the channels eastward of it; and at half flood, the pressure of the stream, setting in a south-westerly direction, is so



divided by the island, that although there is a strong easterly tide along its north and south shores, there is slack water throughout the whole extent of the Russel channel. The offing stream, still revolving, gradually forces the flood to the north-eastward through these channels; attaining its greatest strength, as before stated, near high water.

A proper consideration of the foregoing general remarks is necessary to understand the cause of the innumerable sets of tide and eddies about these islands. It must also be remembered, that a body of water once set in motion will continue to move onward for some time after the force which originated it has been removed; thus the Russel streams continue to run to the southward (after low water) for some time after the source of their supply has been cut off by the shutting in of the offing stream behind Guernsey; and these southerly streams being met off St. Martin point by the first of the eastern stream, they blend together and make a south-east tide, which at springs runs with considerable strength, from the north end of the Great bank to the S.E. for some distance outside the Têtes d'Aval, but is not felt inside the Great bank, or near St. Martin point.

An illustration of the value of a knowledge of the tides will be seen by following the track of the Guernsey boatman, on a trip to the east side of Serk and back. He will take a fair tide the whole distance. Leaving Guernsey road a little after low water, he proceeds with a fair tide to the S.E. outside the Têtes d'Aval, until he meets the eastern stream, with which he sails to the southward of Serk. Near L'Etac de Serk he meets a northerly tide, which accompanies him along the east side of the island as far as the Creaux. On his return to Guernsey, he will be able to round the north point of Serk about an hour after high water, at which time the turning of the offing stream towards the north removes the pressure of the Great Russel stream from the Bec du Nez, and causes an eddy from it to the Givaude rock, off Brecqhou, and carry an eddy or counter stream as far as the Givaude rock, outside of which he will meet the true stream setting to the N.W., at 2 hours after high water. Going with this stream, he will pass through the Passe de la Percée, and crossing the Little Russel arrive at St. Peter Port before the south-western stream has fairly made.

It appears that the general drift of the tidal stream corresponds with its rotary motion from right to left, close to the coasts of the Channel islands as well as in the offing outside them; for it has frequently happened that floating objects near the shore have been seen successively on their northern, western, southern, and eastern coasts. Moreover part of a wrecked vessel, having been drifted from a rock near the Casquets during calm weather, was known to take a south-westerly course, and to drift, with a rotary motion through a succession of parabolic tidal curves

at the rate of about 4 miles per day, round the western and southern coasts of Guernsey, several miles distant from the island, and up the Deroute and Race streams; whilst other parts of the same wreck, having probably drifted off the Rock at the commencement of the western stream and thereby set farther out to the westward, were met with about the same time several miles within and to the eastward of Roches Douvres.

These last examples prove the existence of a current whose drift coincides with the shifting movement of the tidal stream, south-westerly from the Casquets, southerly past Guernsey, and easterly and southerly between Guernsey and the Roches Douvres. The easterly or main branch of this current, as already noticed, passes up the Deroute and Race channels, and it seems highly probable that after clearing the Race of Alderney it turns off to the westward past that island, to reunite with its own stream again off the Casquets, and repeat the same round as before in endless succession. This current, hitherto known under the name of "indraught of the gulf of St. Malo" is generally believed to exist only during fresh westerly breezes, and doubtless its strength is greatly increased at such times, but there is no doubt it runs continuously between the Casquets and the Roches Douvres, and with a rate proportioned to the strength of the tidal stream.

A little consideration of the facts stated above will serve to show, that vessels going round the islands, as well as those navigating the channels, between them, may occasionally shorten their passages materially by following the curves of the tidal streams instead of taking direct courses.

Caution.—Although the flood stream begins to set through the Little Russel at the same time that it does in the Great Russel, viz., at half tide, yet there is no northern inclination round St. Martin point, until 4 hours flood; care must therefore be taken that the first of the eastern stream does not draw the vessel into the Great Russel, or among the rocks in the vicinity of the Têtes d'Aval.

DANGERS off N.W. COAST.—The north-west side of Guernsey should not be approached nearer than $3\frac{1}{2}$ miles, there being several dangerous rocky ledges lying off it; those most to be feared are the Grunes de l'Ouest, or du Nord-Ouai, Sambule, Soufleursse, Boin, and Grande Etacre. The Grunes de l'Ouest dry 10 feet at low-water spring tides; the Sambule 16 feet; the Soufleursse 10 feet; the Boin 3 feet; and the Grande Etacre 19 feet. The positions of the outer rocks of the Banc du Hanois, Banc Bisé, and other dangers off them have been briefly described in page 188.

From the outer head of the Grune de l'Ouest, on which it is proposed to erect a beacon, Câtel church spire appears just open eastward of Guet du

Câtel, S.S.E., southerly and Hanois lighthouse is in line with the rock off the west end of Lihou island, next within Corner rock, S.W. $\frac{3}{4}$ W.

From the Sambule, Câtel church is in line with Vazon tower, S.E.; St. Saviour church is in line with the Conchée rock; and the Hanois lighthouse is just open westward of Corner rock, S.W. $\frac{1}{2}$ W.

The Grand Etacre lies with the church of St. Pierre du Bois, without a spire, over the west part of Lihou island, S.S.E. $\frac{1}{2}$ E.; Vazon tower touching the south side of Gros Pont, E. by S. $\frac{3}{4}$ S.; and Hanois lighthouse just open eastward of the Pendante, S.W., southerly.

There are also several dangerous sunken rocks, on which the sea breaks heavily in bad weather, considerably outside these dangers; as the Boue Blondel, of $5\frac{1}{4}$ fathoms water, lying with Torteval church spire over the west part of Lihou island, S. $\frac{3}{4}$ E., distant $2\frac{1}{4}$ miles from the latter; the inner head of the Roches de l'Ouest of $5\frac{3}{4}$ fathoms, lying with Câtel church, the Guet du Câtel, and the outer and highest head of the Grunes in line S.S.E. three-quarters of a mile outside the latter; and the outer head of the Frettes of $5\frac{1}{2}$ fathoms, lying with Câtel church just open eastward of Grand Roque tower, S. $\frac{1}{4}$ W. $2\frac{3}{4}$ miles from the tower.

The Hanois lighthouse kept just open westward of the Pendante, the outer rock of the Trois Pères group, S.W. $\frac{1}{4}$ S. until Vale church comes in line with the Grand Saut Roquier, S.E. by E., will lead inside the above sunken rocks and outside the Etacre, the Sambule, the Boin, and the Grunes de l'Ouest.

Caution.—Unless a vessel is quite under command, and in charge of a pilot, she should not approach these rocks nearer than 2 miles; also if proceeding round the south side of the island to St. Peter Port; Corbière point, and Moye point, two remarkable headlands on the south coast between Pleinmont and Icart points, and the land to the eastward, should always be kept open of Pleinmont point.

DANGERS off SOUTH COAST.—Pleinmont ledge has 9 feet water on the shoalest part, which lies S.W. $\frac{1}{4}$ W. nearly two-thirds of a mile from Pleinmont Guet, but only one-third of a mile outside the Herpin rock.

The Boue Baker of 16 feet water, lies with the Round rock just shut in with Pleinmont point, N. by W. $\frac{1}{2}$ W.; and Torteval church-spire on with the north part of a remarkable projecting bluff marked by a white spot in the bay under, N.E. $\frac{1}{4}$ E.

The Boues des Kaines, of 29 feet water, lie with the extreme of the Moye point in line with the inner guard-house on Icart point, E. $\frac{1}{2}$ S.; Torteval church-spire just in sight above the cliff, and a point open westward of Guet du Tielle, N. $\frac{3}{4}$ E.; and the Grand Hanois within the Tas de Pois, and in line with Pleinmont point, N.W. by N.

Within these rocks there are many others, some of which uncover at or near low water; as the Kaines d'Amont, lying S.W. from the Guet du Tielle, and nearly half a mile from the land; the Lieuses, lying S.W. from Corbière point, and nearly half a mile from the land, dry 8 feet at low water; and Les Sept Boues, nearly a quarter of a mile within it, dry 10 feet.

DANGERS off EAST COAST.—The dangers to be avoided in rounding St. Martin point, the south-east extreme of Guernsey, are the Grunes de Jerbourg, described at page 199, the Longue Pierre and Gabrielle rocks, as well as the shoal part of the Great bank. The Longue Pierre dries 19 feet at low-water springs, and is marked by a black staff and ball beacon. The Gabrielle dries 4 feet at low-water, at which period there are 23 feet on the south end, 19 feet on the middle, and 17 feet on the north part of the Great bank.

A vessel, to pass eastward of these rocks and westward of the shoal part of the bank, should keep Saumarez monument in line with, or a little open of, the end of the breakwater off castle Cornet, bearing N. by E. $\frac{1}{2}$ E.; this mark will also lead outside the Anfré rock marked by a pole beacon; and between the Ferico and Oyster rocks, to the Tremies. From the Gabrielle rock, Saumarez monument is just shut in with north-east angle of castle Cornet.

THE GREAT BANK, within the 5 fathoms line at low-water springs, is $1\frac{1}{2}$ miles long and 2 cables broad. From its southern limit, St. Peter Port church is in line with the Anfré beacon; and from its northern limit the north angle of the castle Cornet, the old harbour lighthouse, and Elizabeth college tower are in one. The shoalest part, 17 feet, lies 2 cables southward of this latter line of direction, and from it the above church is just open of south angle of castle Cornet; the Anfré beacon, and the white stone beacon on the top of Fermain point in line, leads northward of it, and crosses the north end of the bank in 20 feet at low water.

Several dangerous rocks lying in the vicinity of castle Cornet must be carefully avoided when running for St. Peter Port road, viz.:—the Tremies to the north-east of the castle and south nearly half a cable from the breakwater lighthouse, the Ferico to the east, the Oyster rock to the south-east, and the Moulinet to the south-west, which latter is marked by a pole and bird beacon.

Ferico is a dangerous rock with only 9 feet on it at low-water, lying $1\frac{1}{2}$ cables eastward of the castle, and in the fairway of vessels bound to St. Peter Port from the southward. To pass eastward of it, keep St. Martin barracks open south-east of the Anfré beacon until Salerie point opens of the end of castle Cornet breakwater, or bring castle Cornet breakwater



light to bear N.N.W. The Foreign rock, of 38 feet water, lies a little outside the Ferico, and will be cleared on the east side by the same marks. The Oyster rock dries 12 feet at low water.

Directions.—A vessel bound from the westward to the anchorage off the eastern side of Guernsey, and intending to pass southward of the island, should, as before stated, make a careful allowance for the flood stream, if it be running, as it sets in towards the land. Rounding Pleinmont point, give the lighthouse on the Hanois rocks a berth of at least $1\frac{1}{2}$ miles, to avoid the Hanois and Bise banks; and to clear the Hanois rocks, keep Cobière point, or Moye point, open of Pleinmont point bearing S.E. by E. $\frac{1}{4}$ E.

To clear Pleinmont ledge and the other dangers between it and Moye point, do not shut in Lihou island with Pleinmont point until Serk church which stands northward of the mill, comes open of Jerbourg point. When abreast La Moye point, open the north point of Serk with Jerbourg point, or keep Pleimont bluff open of Cobière point, to avoid the Balliene rock, which lies W.S.W a quarter of a mile from Icart point, and is awash at low water. After passing this point, keep Sommeilleuse guard-house, a ruin standing on the edge of a remarkable high cliff a short distance eastward of Moye point, a little open southward of Icart low point until Brehon tower opens eastward of the Longue Pierre, or until the ruin of Herm mill touches the north side of the high land of Jethou. These marks will lead outside the Grunes de Jerbourg, which are a dangerous cluster of rocks a quarter of a mile from the shore, and in a south-west direction from St. Martin point; they are covered at one quarter flood, and have 26 fathoms close to their south side.

Rounding St. Martin point, when Saumarez monument is in line with the end of castle Cornet breakwater, proceed with this mark on, between the Anfré rock and Great bank, keeping St. Martin barracks open southward of the Anfré beacon until Salerie battery opens of castle Cornet breakwater, or the breakwater lighthouse bears N.N.W. When the town church comes open of the breakwater, anchor in the road as convenient, or run into the harbour.

To pass eastward of the Great bank, keep Vale mill about midway between Mont Crevelt tower and Vale castle, and touching the east end of the breakwater off St. Sampson harbour, N. $\frac{1}{2}$ E.; and when the town church is shut in behind castle Cornet haul in for the anchorage.

At night, when running for this anchorage from the northward and eastward, through the Great Russel, steer to the south-westward till the red light on the south pier head of St. Peter Port old harbour bears N.W. by N., or opens southward of castle Cornet, which mark leads southward of the Têtes d'Aval, and over the north end of the Great bank, in

22 feet at low water. On nearing the castle and running for the harbour, bring the light to bear W. by N. $\frac{1}{4}$ N. which is also the best line to anchor on in the road. The light open and shut of the south part of castle Cornet leads only 150 feet southward of the Têtes d'Aval, and across the Great bank in 21 feet at low water.

Steering for the Little Russel from the northward, keep the Casquet light on a N.E. $\frac{1}{4}$ N. bearing until castle Cornet breakwater light bears S.W. by W. $\frac{1}{4}$ W., this being the line of bearing for the central track. This passage, however, should never be attempted at night by a stranger, nor even by a person acquainted with the place, unless in a steam vessel of light draught, at or near high water.

From the westward and southward, after passing St. Martin point, steer to the eastward until the old harbour red light is seen clear of Terres point, bearing N. $\frac{1}{4}$ E.; keep it in sight on this line, and it will lead a quarter of a mile eastward of the Longue Pierre. When St. Martin point bears S.W. $\frac{1}{4}$ W. steer N.E. by N., to pass between the Anfré rock and the Great Bank, and when castle Cornet breakwater light bears N.N.W. steer N. by E. until the red light bears W. by N. $\frac{1}{4}$ N. after which proceed as before directed.

ST. SAMPSON HARBOUR is on the eastern side of Guernsey between Vale Castle and Mont Crevelt, but vessels lie aground in it at low water. The site now occupied by this harbour was originally the eastern entrance creek to an arm of the sea which severed the northern portion of Guernsey from the main island. About sixty years since this strait was embanked at each end, and since that period the intervening land has been reclaimed.

The harbour may be termed rectangular in form; its extreme length being about 1,900 feet N.W. and S.E. with an average width of 500 feet, and containing a water area of 22 acres at high water springs. At low water springs this space is dry, and the tide ebbs for a considerable distance outside the pier heads. The entrance between the pier heads is 120 feet wide, and the depth there 15 feet at high water ordinary neaps. At this time there are 12 feet along the south pier, and 11 feet for a length of 150 feet along the south quay, the remainder of which gradually shoals to its western end.

A rocky patch, with 10 feet water, lies near the centre of the channel leading to St. Sampson harbour; from this patch the Grunette beacon is apparently just touching the south side of Mont Crevelt battery, and the town church St. Peter Port is just seen open east of Vivian beacon.

Directions.—The approach to this harbour is difficult, being athwart the tidal streams; and on account of the Crabière, Grunette, and



Grande Demie rocks, which lie off the entrance. The most dangerous of these is the Crabière, in the fairway of the entrance, and distant about 200 yards from the head of Mont Crevelt breakwater ; it has, however, been reduced in height, having now 9 feet on it at half tide.

The best entrance into the harbour is between the Crabière and the Grunette, the latter being marked by a beacon (the figure of a man), this passage, however, is not above half a cable wide, and the leading mark is the beacon on the Grunette in line with the south tangent of the breakwater, until close up to the beacon, when pass 50 yards north of it and steer in between the pier heads. The bottom is blue clay covered with a layer of sand.

A life boat is stationed at St. Sampson harbour.

BORDEAUX HARBOUR, to the northward of St. Sampson, is used only by fisherman. Here vessels must lie aground the same as at St. Sampson ; and as the entrance to the harbour will not admit of larger vessels than those of 10 tons burthen, a further description is needless.

L'ANCRESSE BAY, on the north side of Guernsey, to the westward of fort Le Marchant, affords good shelter for small craft against southeasterly, southerly, and westerly winds, in 6 to 2 fathoms water. The bottom is muddy sand, and excellent for holding.

GRAND HAVRE, to the westward of Ancresse bay and north-westward of Vale church, has its entrance between the martello tower on Mont Guet to the North, and the martello tower on Rousse point to the south. It affords excellent anchorage for small vessels, in 14 to 9 feet water, with good shelter against southerly and all easterly winds, over a bottom of sand and grass ; north-westerly winds, however, send in a heavy swell and sea, between half flood and half ebb ; though there is little danger to be apprehended if the ground tackling be good. For vessels capable of taking the ground, there is a safe place for that purpose on the south-eastern side of Rousse point. A dangerous rock lies in the fairway of the entrance, called the Rousse de Mer, which appears at a quarter ebb ; and on each side of it there are several other rocks. The marks for this rock are Saumarez monument just shut in with the south-western angle of Vale church, S. by E., and the house on the highest part of Lihou island in line with the highest part of the Grand Saut Roquier, W. by S. $\frac{1}{2}$ S.

Directions.—From the numerous dangers that lie off the entrance to Grand Havre there is only one channel by which it can be safely approached by a stranger. This channel lies between the Rousse de Mer and Main rocks ; the former rock dries 20 feet, and the latter 5 feet, at low-water springs.

Bring Victoria tower in line with the rocky point just eastward of the tower on Rousse point, bearing S. by W., and run in on this line until Saumarez monument opens south-west of Vale church; then steer for the high rocky bluff near the middle of the bay, and anchor when about midway between the towers on entrance points, in 10 feet at low water. A vessel of only 6 feet draught may anchor with Noirmont house in line with the tower on Rousse point, and Victoria tower about midway between Rousse point and the rocky bluff near the middle of the bay to the eastward of it.

Roque Noire, Boue Corneille, L'Etac, and Saut Roquier Rocks, extending three-quarters of a mile in a W. by S. direction, from the coast between Grand Havre and Grand Roque point, at the distance of three-quarters of a mile from the land. They are always above water and serve to distinguish this part of the coast at high water, when the dangerous rocks around them are covered. Grand Roque point has on it a rocky hummock, from which it takes its name, surmounted by a small fort and watchtower.

The Hoffets are dangerous rocks, most of which uncover only at low tide. The outer head awash at low water, bears N. by E. $\frac{1}{2}$ E, three-quarters of a mile from the Roque Noire. Victoria tower in line with the tower on Rousse point, S. $\frac{3}{4}$ W. westerly leads nearly half a mile eastward of them; the Petite Braye open northward of Roque au Nord clears them to the northward; and Torteval church in line with Houmet fort S.W. $\frac{1}{4}$ W., clears them a quarter of a mile to the westward.

There are some dangerous rocks, awash at low water, extending W.N.W. an eighth of a mile from the Grand Saut Roquier; and others a little outside of them to the northward always covered, the outer of which, called the Moulrette has, 27 feet on it, and lies N.N.W. $\frac{1}{4}$ W. nearly half a mile from the Grand Saut Roquier. There is a good channel inside all these rocks; the middle of which lies with the lower house on Lihou island, touching the outer corner of the Mouillière rock W. by S. $\frac{1}{2}$ S; there is also a channel between the inner head of the Hoffets and the Boue Corneille, but neither should be attempted without a pilot.

Plaquiérs Rocks, with 8 feet water over them, lie half a mile westward of the Grand Saut Roquier, with Victoria tower just open south-west of Grand Roque tower. They will be cleared by opening Victoria tower one side or the other of Grand Roque tower.

Anchorage, secure from easterly winds, will be found inside the Grand Saut Roquier.

COBO and VAZON BAYS have also good anchorage in easterly winds, but with westerly winds there is generally a rolling swell along this



part of the coast on the flood tide ; and this, together with the numerous outlying rocks, render these bays dangerous for strangers to approach.

The principal dangers off these bays inside the Grunes de l'Ouest described in page 196, are the Susanne, which dries 7 feet at low water S.E. by E. a quarter of a mile from the Grunes ; the Grunette dries 3 feet, S. by E. $\frac{1}{4}$ E., half a mile from the Grunes ; the Boue Auber dries 8 feet, E. by S. $\frac{3}{4}$ S. nearly half a mile from the Sambule ; and the Flabet dries one foot, about midway between the Grand Etacre and Sambule.

Also the Colombelle dries 2 feet, N.W., nearly half a mile outside the Conchée ; the Messellettes, awash at low water, lies N.N.E., half a mile from the Conchée ; the Boue Vazon dries 7 feet, and lies with St. George tower (white) in line with south-west angle of Houmet fort, and the upper house on Lihou island, just open inside the Conchée. The Fourquies, awash at low water, lies S.W. a quarter of a mile from the Boue Vazon ; the Petit Etat dries 20 feet N.N.W., a quarter of a mile from Houmet fort, and the Gross Etat, 34 feet high, lies an eighth of a mile within it, at the outer extremity of the rocks of Houmet fort.

The Mouillière, lying N. by E. five-eighths of a mile from Houmet fort, is 4 feet above high-water springs. It is surrounded by rocks, many of which uncover at low water, extending rather more than a cable to the westward, but not more than three-quarters of a cable to the northward. The large lower house on Lihou island in line with the Conchée, W. by S. $\frac{3}{4}$ S., will lead clear northward of these rocks.

Directions.—To approach Vazon bay from the north-eastward, bring Torteval church open westward of Houmet fort, and run in ; being careful to have Torteval church in line with Richmond fort, S.W. by S., before passing the Grand Sant Roquier, which mark will lead midway between the Grunettes and Mouillière, and nearly a cable eastward of the Boue Vazon ; within which anchor as convenient, in 6 to 8 fathoms, sand.

To run out of the bay between the Grunettes and Boue Auber, bring St. George turret in line with east side of Houmet fort. The large lower house on Lihou island in line with the Conchée, leads nearly a cable northward of the Boue Vazon ; and St. Matthew church on with south-west end of Houmet fort leads out between the Sambule and Colombelle.

PERELLE BAY affords good shelter to fishing boats at low water, but is only safe for such as can take the beach, in the event of a westerly gale setting in.

To clear the sunken rocks extending from the Grand Etacre towards Lihou island, when passing between it and Lihou, keep the Hanois light-

house open a little eastward of the Trois Pères, or pass through about mid-channel.

ROCQUAINE BAY is fronted by numerous groups of rocks as well as isolated ones, many of which are always above water; a far greater number uncover with the falling tide, whilst those that are always hidden below low water are still more numerous.

The anchorage in this bay is well sheltered from northerly, easterly, and southerly winds; but westerly winds send in such a heavy sea, especially between half-flood and half-ebb, that a sailing vessel caught in the bay under such circumstances could not possibly get out. The holding ground, consisting generally of fine gravel and sand covered with grass and sea-weed, is not good. It is only frequented by fishermen resident in the neighbourhood, or occasionally by vessels calculated to take the beach; nevertheless, at the anchorage in the south-west part of the bay off Peserie point, a vessel of not more than 12 or 13 feet draught, well moored, would ride securely all the year round, and under any circumstances of wind and weather.

The most remarkable rocks, bounding Rocquaine bay to the westward and southward, that never cover with the tide are, the *Mauve*, 48 feet high above low water; the *Bisé*, on which the Hanois lighthouse stands; *Grand Hanois*, 70 feet high; *Petit Hanois*; *Hayes rock*, 30 feet high; *Percée*, 32 feet high; *Round rock*, 51 feet high; *Grosse rock*, 69 feet high.

Banc des Trois Pères.—The largest and most conspicuous rocky group in the northern part of Rocquaine bay is called the Banc des Trois Pères, the outer rock of which, named the *Pendante*, is 50 feet above low water, and lies West one mile from Lihou upper house. The Trois Pères rocks are about the same height, but nearly a cable within the *Pendante*. There are also other rocks nearly the same height fronting this reef to the eastward.

There is a passage between the Trois Pères bank and Lihou island, with a depth through of not less than 15 feet at low water, the marks for which are given at page 205; but neither this nor any other passage into Rocquaine bay should be attempted without a pilot, unless under most urgent circumstances.

Banc des Hanois lies three-quarters of a mile westward of the *Pendante* rock. It extends N.N.W. and S.S.E. about half a mile and the highest rock, called the *Haut Fourquie*, is on its inner part, and dries 10 feet at low water; there are also two rocks which dry 5 feet near its outer extremity. The outer sunken rock of the bank has 6 feet on it at low water; the marks for it are, *Tas de Pois d'Aval* on with the inner part of the *Percée* rock S.S.E. $\frac{1}{4}$ E. and the *Guet du Câtel* just to the southward of the lower house on Lihou island, and on the same side

of the rock next within the Grand Battue, E. $\frac{1}{4}$ S.; Guet du C  tel in line with Lihou upper house, E. $\frac{1}{4}$ S., leads $1\frac{1}{2}$ cables northward of the bank.

Banc Bis  , the westernmost danger off Guernsey, lies rather more than a third of a mile outside the Mauve, which rock is 10 feet above high-water springs. This bank is connected with the Mauve by a chain of sunken rocks, as the Mauve is with the Bis  , the rock on which the Hanois lighthouse is built. The outer sunken rock of the bank is three-quarters of a mile N.N.W. from the lighthouse, and has 15 feet on it at low water; it lies with the lighthouse just open westward of the head of the Mauve S.S.E.; and Lihou upper house over the middle of the Trois P  res E. $\frac{1}{4}$ N.

Directions.—To enter Rocquaine bay from the southward, inside the Hayes rock, bring the outer high-water rock called Corner rock, off Lihou island in line with Nipple rock, which dries 26 feet at low water, bearing N.N.E. $\frac{3}{4}$ E. and run in until abreast the Perc  e rock; within which, Black rock will soon come in line with a remarkable rock on Lihou saddle; this mark will lead into a good anchorage a little beyond the Nipple rock in 4 fathoms at low water.

Should it be desired to go into the anchorage off the Torquetil rock in $2\frac{1}{2}$ fathoms at low water, Cacquerau house on with the north side of the Torquetil E. $\frac{1}{4}$ N. will be the leading mark, until Fort Grey comes in line with the Braye rock; when Cacquerau house must be opened a little northward of the Torquetil, to clear a rock with only 4 feet on it at low water; after passing which, anchor as convenient. Marks are given on the Admiralty chart for entering the inner anchorage off Pezerie point, but being useless to strangers on account of the narrowness of the channel, they are not repeated here.

The passage into Rocquaine bay, between Lihou island and the Trois P  res bank, may be entered by bringing Torteval church in line with the north-east corner of Fort Grey S. by E. $\frac{3}{4}$ E.; this mark will lead safely as far as the Fourquie, a rock which dries 17 feet at low water, and which must be passed rather close, to the westward, within which as directions to the stranger would be useless, we must refer him to the chart.

By bringing Torteval church in line with the south-west side of Round rock S.E. $\frac{1}{4}$ E., a vessel could pass safely between the Banc des Hanois and the Aiguillons; and by opening Torteval church a little to the south-west of Round rock, after passing the Aiguillons, she could enter Rocquaine bay to the south-east of the Round rock.

There is no channel for ships into Rocquaine bay between the Trois P  res and the Banc des Hanois.

ICART and PETIT PORT BAYS, on the south side of Guernsey, afford good anchorage and shelter in easterly and northerly winds.

Petit port being larger and easier of access, is by far the better bay of the two ; the ground being clean, fine white sand, and any depth of water may be chosen from 5 to 9 fathoms, but a sailing vessel at anchor here should be in readiness to put to sea immediately a shift of wind renders it necessary.

The only danger in entering Petit Port bay is the Banc du Petit Port, with 12 feet on it at low water. It lies W. $\frac{1}{2}$ S. a quarter of a mile from Jerbourg point, and to clear it in entering, do not shut in the Goubinière rock with St. Martin point until Doyle column opens westward of a remarkably high rocky bluff on the east side of the sandy bay under it. The column on with peak of rocky bluff, N.E. by E. $\frac{1}{2}$ E. is the leading mark in. A dangerous rock named Moulière, with only 4 feet over it at high-water spring lies nearly in the centre of the bay, with Doyle column just inside the inner end of the cliffs on the east side of the sandy beach under it bearing E. by N., and Jerbourg point S.S.E. $\frac{1}{2}$ E. one-third of a mile.

HERM and JETHOU ISLANDS, together with Amfroque rocks on the north, and Ferrière rocks on the south, extend rather more than 5 miles in a N.E. $\frac{1}{2}$ N. and S.W. $\frac{1}{2}$ S. direction, and divide the Great and Little Russel channels from each other. Herm is $1\frac{1}{4}$ miles long, half a mile wide, elevated 232 feet above the level of low water, and its centre bears E. by S. $\frac{1}{2}$ S. $3\frac{1}{4}$ miles from St. Peter Port. The little island of Jethou lies S.W. half a mile from Herm, and is 16 feet higher than it. The rocky islets, Crevichon and Fauconnière, are connected with Jethou at low water, the former to its north side and the latter to its south ; they are each marked on their conical summits by white stone beacons.

The Ferrières are most conspicuous rocks to the southward of Jethou, that never cover with the tide. The north head of the outer or western rock, called the Barbées, situated S.W. nearly three-quarters of a mile from Jethou, is marked by a beacon, consisting of a staff and barrel. The Demie Ferrière has a beacon with the letter M on it, 10 feet above high water. There are good ship channels between these rocks, and especially between the Ferrières rocks and the Têtes d'Aval, but they should not be attempted without a pilot.

Amfroque Rocks extend from Herm to the north-eastward for rather more than 2 miles. The outermost rock, showing above high water, is called the Grande Amfroque, it has two peaks, and is nearly three-quarters of a cable in diameter and 78 feet above low water. It is surrounded by dangerous rocks, of which the easternmost is the Bonne Grune, with 14 feet over it at low water, bearing from the Grand Amfroque E. $\frac{3}{4}$ S. $1\frac{1}{2}$ miles. The Selle d'Amfroque, bearing N.E. by E., half a mile from the Grande Amfroque, has 17 feet over it ; and within it to the westward lie the Demies du Nord, and the Petite Amfroque, which uncover with the tide.

Beacons.—There are two conical stone beacons on Grande Amfroque 105 feet apart, bearing S. $\frac{3}{4}$ E. and N. $\frac{3}{4}$ W. from each other; the higher beacon is surmounted by a cross, and the lower one by a round cage; the eastern is 35 feet above the rock, and painted black and white in horizontal bands, the western is 20 feet high, and painted white.

Cul de l'Autel and Longue Pierre rocks.—At rather more than a half mile West from the Grand Amfroque, lies a table rock elevated 58 feet, called Cul de l'Autel; and between the Cul de l'Autel and the north point of Herm, at nearly equal distances, and about the same height (70 feet), lie the Longue Pierre and Traiffe rocks, also Godin islet; which, as well as the Longue Pierre, is covered with a light soil, on which grow a variety of wild flowers; the Traiffe lies near the south-east side of the Longue Pierre and resembles a ship under sail. Besides these there are others of minor importance that the tide never covers, as well as numerous rocks and ledges that are alternately covered and uncovered, and many which never appear at all.

Platte Boué rock*, lying three-quarters of a mile northward of the Grande Amfroque, is the northernmost danger off Herm, at the eastern side of the entrance to the Little Russel, and consists of three heads; the westernmost head has one foot, and the southernmost 3 feet on it at low water springs. It is about 20 feet in diameter, dries 3 feet at low water, and is steep to all round except to the E.N.E., in which direction, at the distance of 500 feet, there is a rock with 15 feet over it at low water.

The marks for the Platte Boué are Câtel church-spire in line with the Canteen house at the gate of Vale castle (showing on its south-east angle), bearing W. by S., the Grand Moie, the highest detached rock on the east side of Serk, just open eastward of the Grande Amfroque S. by E. and the two beacons of Grande Amfroque in line bearing S. $\frac{3}{4}$ E.

Clearing marks.—Tautenay beacon in line with Doyles column, Guernsey, will lead $1\frac{1}{2}$ cables north-westward of Platte Boué rock; Brehon tower in line with Tautenay beacon is a good mark for leading northward of it.

HAYES CHANNEL and PASSE de la PERCÉE.—The channels between the above rocks and islets are extremely intricate, and rendered even more dangerous by the rapidity and variety of the tides; two of them, however, viz., Hayes channel, between Godin islet and the Longue Pierre rocks, and Passe de la Percée, between Herm and Jethou, are nevertheless sometimes used for ships by the Guernsey pilots.

Hayes channel has a rock, awash at low water, at its eastern entrance on the line of the Longue Pierre and Godin. To sail southward of it,

* Recent information on Platte Boué rock by Commander Anson, H.M.S. *Dasher*, 1881.

keep Vale mill in sight to the southward of the Pierre de la Moue, until past that line. Pass a cable northward of the Pierre de la Moue, and then gradually haul to the southward until the high land of Serk at Banquette point comes over Godin. When the Grande Amfroque is in one with the Longue Pierre, keep it so, until the peak of Godin is nearly in line with the north extreme of Galeu, S.E.; which mark will lead into the Little Russel, between the Tautenay ledge and the rocky bank extending from the north point of Herm.

Anchorage, out of the strength of the tide, and with good holding ground, will be found South of Tautenay ledge, by bringing the peak of Godin between the two sharp-peaked rocks of Galeu, S.E. $\frac{1}{2}$ E. and Brehon tower in line with the Rousse rock S.W. by W. $\frac{1}{2}$ W.

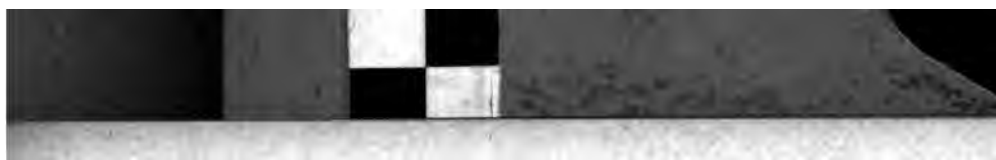
There is good anchorage also S.W. of this, inside the Cavale rock, in 6 fathoms, sand; with the Pierre aux Rats, a small stone obelisk on Herm, in line with the Mouisonnière rock, bearing S.E. $\frac{1}{2}$ S., and Brehon tower between the Rousse rock and the Blanche.

Between Herm and Jethou, off the Mouette rock is the Rosiere anchorage, where small vessels will find good shelter from all winds, excepting those from S.W., round by the south, to S.E. The best entrance into it is from the Great Russel channel.

There is one great convenience attending this latter anchorage, viz., that the tide runs 9 hours to the southward and only 3 to the northward; the former stream commencing when it is low water by the shore, and setting directly into the Great Russel during the whole of the flood, until half ebb, when the latter stream begins and runs faintly to the northward until low water. A vessel, therefore, caught here by a southerly wind, may always, at half ebb, run northward through the Passe de la Percée into the Little Russel channel, and thence to the anchorage inside the Cavale rock or into the Great road.

Directions.—The dangers to be avoided in running for the Passe de la Percée from the eastward are, the Fourquies; a patch of rocks that uncover near low water, lying right in the fairway and north-eastward of the Goubinière rock, in the Great Russel; and farther in, the Meulettes rock on the starboard, and the Tinker rocks on the port hand. Vale castle touching the south-west end of Herm, bearing N.W. $\frac{1}{2}$ N., will lead eastward of the Fourquies; and Vale mill, the north-easternmost on Guernsey, touching the north-eastern side of Jethou, N.N.W. $\frac{1}{2}$ W., will lead considerably to the westward.

Meulettes Rock lies about half a cable from the south point of Herm, and the Tinker about twice that distance to the eastward of Jethou. The Vermerette rock beacon in line with Percée rock leads westward of the Meulettes; and the west side of the little green plat on the Hermetier half



a point open eastward of the highest part of the Mouette, leads eastward of the Tinker.

To run through the *Passe de la Percée* into the Little Russel, after clearing the Fourquies, bring Vale mill a little open westward of the Percée rock, and also a little open on the same side of the Corbette rock, marked by a beacon N.W. by N.; this latter mark will clear the outer point of the Percée rock, when it is covered, at half tide, at the distance of 60 yards, and lead through the middle of the channel, the narrowest part of which, and least depth (14 feet), will be found on a line between the north extreme of the rocky bank extending from Jethou and the Vermerette rock, which is marked by a staff and white beacon. When Saumarez monument comes open northward of Brehon tower, about the apparent breadth of the tower, take it as a leading mark to clear the Etacre rock: when abreast the Etacre, on this line, the Victoria tower will be seen in one with the Creux rock beacon (staff and truck), with which mark proceed up to the Creux rock, and round it to the southward at the distance of half a cable to get into the Little Russel.

LITTLE RUSSEL CHANNEL lies on the north-west side of Herm between it and Guernsey, and is much contracted by numerous rocks projecting from both islands as far out as the Roustel and Rousse rocks, which are a little more than 3 cables apart. The wind northward of N.N.W., or eastward of S.E., will always prove a leading wind through this channel from the northward, without the certainty of which no square-rigged vessel of large draught should attempt its navigation.

The entrance to the Little Russel from the northward is between the Bray rocks on the western side, and the Amfroque rocks on the eastern. The approach to both these groups is exceedingly dangerous, as well on account of the tides as from the numerous hidden and other rocks by which they are encompassed; the principal of which, and the most dangerous, are the Platte Boue and the Boufresse, in the neighbourhood of the Amfroque, and the Roques de Bray or Platte Fougère in the vicinity of the Bray.

Bray Rocks.—The Grande and Petite Bray rocks lie about a mile off the north-east point of Guernsey; they are within a quarter of a mile of each other, and both are encompassed with outlying dangerous rocks. The Grande Bray, elevated 10 feet above high-water springs, has on it a tripod beacon surmounted by a cross; the Petite Bray is 2 or 3 feet lower.

The Roques de Bray or Platte Fougère, appear about half tide; the ground is clean at the distance of a cable eastward of them. An iron frame beacon stands on the outermost or north-eastern rock of the group surmounted by a red cone 12 feet above the highest tides, to guide vessels into the Little Russel.



Nearly midway between the *Regua* to *Beuze* and *Corbette* rock, the water being marked by staff and red ball, lie the *Campé* rocks: the outer of which, appearing only after the last quarter ebb, is now the principal danger, and marked on the side the *Little Russel*.

To meet the *Beuze* rocks and all dangers eastward and southward of them, keep the north-western end of *Little Serk* a little open eastward of the *new north-western* sandy point of *Horn*, bearing S. by E.: this mark will lead into the fairway of the *Little Russel*.

Platte Roque, lying S.W. by S. half a mile from the *Corbette*, is marked by beacons, most painted with black and white bands. About a cable N.E. from the beacons, is a rock awash at low water; and from this rock towards the *Corbette*, on a line convex towards the *Russel*, there are several dangerous rocks which strangers should carefully avoid when passing.

Boue Agenor, with only 4 feet on it at low water, is the south-western and innermost danger on this side the *Little Russel*, of which it is necessary to caution strangers. It lies with the *Coal hole*, under *Vale* castle, in line with the end of *Sampson* breakwater N. by E. $\frac{1}{2}$ E.; and *Hogue des Quartiers* just open north-east of the ruin of *Ivy* castle N.W. $\frac{1}{2}$ W. There are two rocks, one of 9 feet water, lying nearly a cable S.W. by W. $\frac{1}{2}$ W. of the *Agenor*; another of 12 feet at nearly the same distance S.W. $\frac{1}{2}$ S.; and a third, the *Trois Grunes*, of 13 feet water, lying 2 cables N.E. by E. $\frac{1}{2}$ E. of it.

Rousse Rock.—The following rocks are on the east side of the *Little Russel*:—The *Platte Boue* (described in page 207); the *Boufresse* dries 8 feet at low water; the *Tautenay* is just awash at high water, and has on the north-east end of it a beacon tower 22 feet high painted in black and white vertical stripes, and surmounted by a staff; the *Cavale* which dries one foot at low water. The *Rousse* rock is 8 feet above high-water springs, and is marked with an iron beacon, consisting of a cross with an anchor fluke at each point. A dangerous string of rocks, awash at low water, project in a W. by N. direction 60 yards from the *Rousse*.

To pass northward and westward of all these rocks, keep *Câtel* church spire a quarter of a point open northward of *Vale* castle, W. by S. $\frac{1}{2}$ S.; and when the north-eastern end of *Serk* comes on with the middle of the *Grande Anfroque*, a vessel will be abreast the *Platte Boue*. The above mark, *Câtel* church open northward of *Vale* castle, will also lead into the fairway of the *Little Russel*.

Doyle column in line with *Brehon* tower is a good clearing mark for the rocks on the east side of the *Little Russell*, as far as the *Cavale*, to clear which, the column must be opened one side or the other of *Brehon* tower. The breast mark for the *Cavale* is the *Pierre aux Rats* obelisk in



line with the Mouissonière rock, S.E. $\frac{1}{4}$ S. Doyle column in line with Brehon tower will also clear the rocks extending from the Rousse and lead inside the Boues Genneté.

The Roustel is the most dangerous rock in the Little Russel, as it lies exactly in mid-channel, and does not appear until 4 hours ebb. The beacon on the Rousse bears from it S.S.E. $\frac{1}{4}$ E. $3\frac{1}{4}$ cables; a sunken rock, connected with the Roustel, E.N.E., half a cable; the beacon on the Corbette rock, N. by W. $\frac{1}{4}$ W. rather more than half a mile; the beaccon on the Platte Roque, W. $\frac{1}{4}$ N., half a mile; and the Grune au Rouge rock, S.W. by W. $\frac{1}{4}$ W. nearly one mile.

A black buoy is moored about 20 yards S.W. of the Roustel; and a red buoy, 50 yards N.N.E. from the Grune au Rouge, which latter has only 3 feet on it at low water.

Directions.—The best leading mark to the entrance and through the fairway of the Little Russel channel, when approaching it from the northward, is St. Martin point just open westward of the tower on Brehon rock, bearing S.W. $\frac{1}{4}$ W.; there is no other mark whatever so conspicuous, or which shows the alteration of the vessel's position so quickly. This mark will lead in through the fairway, and between the Roustel and Rousse rocks; and when either the high land at the north-east end of Serk begins to shut in with the northernmost bluff land off Herm, or when Saumarez monument appears within its breadth of Mont Crevelt tower, W. $\frac{3}{4}$ N., a vessel will be abreast the former rock as well as the latter. Near this position, Belvidere house, a large building on the bluff to the eastward of fort George, will be seen in line with a white patch just within the east extreme of castle Cornet; which mark will lead more than half a cable eastward of the Grune au Rouge, about a cable eastward of the Agenor, and all other dangers, and up to the anchorage in the road. This latter mark will lead right up through the Little Russel, clear all the dangers in it, and, being the only line that is possible to answer this desirable purpose, is given here; but as it necessarily passes rather near some of the rocks, the Grune au Rouge, for instance, care must be taken at these parts to keep off a little one side or the other as necessary.

If intending to pass north-westward of the Roustel and Grune au Rouge, bring the near angle of castle Cornet, marked with a vertical white stripe, in line with fort George signal post, and it will lead three-quarters of a cable westward of the Roustel, and one cable westward of the Grune au Rogue. When Brehon and Herm towers come in line, open the leading marks a little either way, as desirable, to clear the Trois Grunes and the Agenor, and proceed on until the town church opens southward of the old harbour lighthouse, then haul in for the anchorage.

If a vessel be compelled to beat through the Little Russel, it may be useful to note, that St. Martin point kept open eastward of the Brehonnet rock will clear the Roustel; and the same point open one side or the other of the Brehon rock will clear the Boues Genneté.

If intending to run through Doyle pass into the Little Russel, keep the windmill on the island of Great Serk, just open northward of the northernmost high land of Herm, and in one also with the Mouissonnière, a remarkable pointed rock on the sandy beach, bearing S.S.E. $\frac{1}{2}$ E. which mark will lead through the pass, between the Roque au Nord and the Grande Braye, inside the Grune Pierre, and between the Grune la Fosse and the Vraic, into the fairway of the Little Russel; but the greatest caution must be used, when near low water, to preserve the leading mark. The narrowest part of the channel is between the Grune Pierre and the rocks off Homptol; its width here being only 650 feet. The Pierre aux Rats obelisk on the north end of Herm, will appear a little to the left of the Mouissonnière.

GREAT RUSSEL CHANNEL lies between the islands of Herm and Jethou, and the clusters of rock, called the Amfroques, the Longue Pierre, the Godin, &c., to the north-west; and the islands of Serk and Brecqhou and the rocks in their vicinity to the south-east. This channel which is the eastern passage to Guernsey, is above two miles wide, and easy of access, even to strangers. The following are the principal dangers in it:

Bonne Grune Rock, with only 14 feet water on it, is the outer danger at the northern entrance of the Great Russel. It lies E. by N. $\frac{1}{4}$ N. 3 miles from the north end of Herm, and E. $\frac{1}{2}$ S. rather more than a mile from the Grande Amfroque; and is cleared to the eastward by opening the west extreme of Little Serk of the east extreme of Brecqhou.

Noir Pute Rock, lying on the western side of the Great Russel, about a mile south-eastward from the mill on Herm, is never wholly covered, though at equinoctial tides it is sometimes nearly awash. A string of rocks awash at low water, extend from it to the north-eastward for nearly $1\frac{1}{2}$ cables. From the Noire Pute, the Doyle column appears a quarter of a point open southward of the Fauconnière.

Fourquies Rocks, which dry 7 feet at low water, lie about three-quarters of a mile eastward of Jethou island, and from their centre St. Martin point is in one with the Goubinière rock, W. by S., and Vale castle in line with the sandy beach on the north-eastern side of Crevichon island N.W. by N.

Grands Bouillons rocks, having only 9 feet over them at low water, lie between the Noir Pute and the Fourquies. The thwart mark for

them is the Caquorobet; a large rock in the form of a hay-stack, projecting from the eastern side of Herm, in line with the north-eastern low sandy point of that island bearing North.

Goubinière rock, elevated 10 feet above high-water springs, lies South, half a mile from Jethou.

Banc des Anons, with 18 feet over them at low water, lie about S.W. by W., a third of a mile from the Goubinière; with Mont Crevelt tower in line with the eastern side of the Grosse Ferrière, bearing N.N.W.

TÊTES d'AVAIL ROCKS lie about S.W. nearly $1\frac{1}{2}$ miles from Jethou island, and dry at low water great springs. The marks for them are, Herm mill (without vanes) in one with a remarkable red-headed rock on the beach between the Grande Fauconnière and Jethou, called the Petite Fauconnière, bearing N.E. $\frac{1}{2}$ E.; Vale mill its apparent breadth open westward of Vale castle, North; and the lighthouse on south pier head of St. Peter Port old harbour, shut in with castle Cornet, N.W. $\frac{1}{2}$ N.

Buoy.—A conical buoy, with black and white horizontal stripes, lies about 120 yards south-west of the middle head of the Têtes d'Aval. Vessels should pass westward of the buoy.

Sardrière rock, with 8 feet water on it, lies south-eastward of the Têtes d'Aval; with St. Martin church spire on with the north side of Fermain beacon, N.W. by W. $\frac{1}{2}$ W., and the Selle Roque twice its apparent breadth open westward of the Goubinière, N.E. $\frac{3}{4}$ E.

Givaude rock, about 70 feet high, forms the eastern boundary of the Great Russel channel. It lies off the west end of Brecqhou, and a reef extends from its north-west point to the distance of nearly half a cable. The Nesté, a pointed rock that dries 20 feet at low water, lies N.E. by N. one cable from the Givaude, on the outer edge of a reef extending from Brecqhou.

The Grune is a sunken rock, over which, however, there are never less than 48 feet water, lying about $1\frac{1}{2}$ miles westward of Brecqhou. The marks for it are, the Grande Amfroque in one with the Noire Pute N.N.E. $\frac{1}{2}$ E., and Victoria tower half the breadth of castle Cornet open northward of it N.W. $\frac{1}{2}$ W.

Directions.—The course to the northern entrance of the Great Russel channel, from the middle of Alderney Race, is about W.S.W., and the distance 21 miles. In proceeding, however, towards this channel from the north-eastward, great care must be taken to avoid the Banc de la Schôle (described at page 255), lying nearly in the direct line between Alderney Race and the entrance.

Having entered the channel, with the western extreme of Little Serk open eastward of the eastern extreme of Brecqhou, in order to avoid

the Bonne Grune, the north-eastern danger on the western side of the channel, bring St. Martin point a quarter of a point open southward of the Goubinière rock, bearing W. $\frac{1}{4}$ S.; this will lead southward of the Noire Pute, the Grands Bouillons, and the Fourquies. Continue to run with this mark on until the Grande Amfroque appears within its own apparent breadth of the Selle Roque, a rock near the south-east point of Herm bearing N.E. This latter mark must now be preserved until the lighthouse on the south pier head of St. Peter Port old harbour comes open southward of castle Cornet, or until St. Martin church steeple, seen over the trees, is in line with the Martello tower in Fermain bay; either of these two marks will lead southward of the Sardrière and the Têtes d'Aval; after having rounded which, steer boldly for the Great road.

There is a good channel between the Têtes d'Aval and the Ferrière rocks, the middle of which lies with Victoria tower half-way between castle Cornet flagstaff and the north angle of the castle wall bearing N.W. This channel, however, should not be attempted by a stranger unless in cases of emergency, the difficulty of the tides rendering its navigation hazardous.

When turning through the Great Russel, in standing to the south-eastward, the island of Serk may be approached to about half a mile without fear, as between the Bec du Nez and Brecqhou island there are no rocks farther than a quarter of a mile from the shore; but take care when standing towards the west point of Brecqhou, and to the southward of it, to keep the Grande Amfroque its own apparent length open westward of the Givaude rock, N. by E. $\frac{1}{4}$ E., to clear the Dents and Hautes Boues.

When standing northward towards Herm and Jethou, do not shut in St. Martin point with the Goubinière when to the eastward of the latter rock, but keep it a quarter of a point open southward of it, to avoid the Fourquies and the Bouillons; and then proceed as before directed.

The north-eastern stream of tide slacks half an hour sooner on the south-eastern side of the Great Russel, than on its north-western side.

Serk.—This island lie $3\frac{1}{4}$ miles S.E. by S. from Herm, and divides the Great Russel from the Deroute channel. The island is $1\frac{1}{2}$ miles broad, and nearly $2\frac{3}{4}$ miles long, including Little Serk, with which it communicates by an isthmus or very narrow causeway, called La Coupée. It is lofty and precipitous in all its extent, and its highest part, at the base of the windmill near the centre of the island, is 375 feet above the level of low water. The small island of Brecqhou lies on its western side, being separated from it by a narrow channel only 70 yards wide, named by the islanders Guoliot pass, through which the tides run with great velocity.

There is no town in Serk; there is however a hamlet or group of cottages, called La Ville, on the north-east side of the island. The island constitutes one Royal Fief or Manor held direct from the Crown. There are forty original copyhold farms, averaging 15 acres each, the title to which descends in succession to the eldest sons, or if no sons, to the eldest daughters of their occupants; the junior members of the different families are therefore frequently compelled to emigrate.

The island is fertile, highly cultivated, and besides supplying all the wants of its inhabitants it exports largely in cereals and vegetables to Guernsey. Its rocky coasts abound with fish, particularly with crabs and lobsters. All able-bodied men belonging to the island are organised as militia, of which there are 140 of all arms. In 1871 the population was registered at 551. There is a church where the Anglican service is regularly conducted in French. There are also two endowed schools.

The approach to Serk on the north-eastern, eastern, south-eastern, and south-western sides, is difficult by reason of the numerous rocks which encompass it, as well as by the rapidity and irregularities of the tide in its immediate vicinity. These difficulties, however, may be easily overcome, if common attention be paid to the leading marks and run of the stream; and the island will afford good security against almost all winds, as will be shown in the description of the different bays.

There are several small inlets in various parts of the rocky coasts of the island, where the inhabitants haul up and secure their boats in stormy weather; the most noted and frequented of which is Le Creux, so called from a subterraneous passage in its neighbourhood. It lies on the eastern side of the island, and is the general rendezvous for landing and shipping, when the weather will permit, as well as the principal resort of the fishing and other island boats. The small harbour here situated has lately been enlarged, and now affords perfect security to small craft; its entrance is, however, only 60 feet wide, and dries at low water of spring tides.

Water.—There is a tolerable run of water on the north side of Baleine bay, to the westward of Château point, on the south-west side of Serk: the stream from it during the winter season is very copious, and may be procured with off-shore winds without difficulty. It is the only accessible watering place round the island, with the exception of an inconsiderable drain in port du Moulin, on its north-west side, and another of similar character at Creux harbour.

ISLETS and ROCKS around SERK.—The following islets and rocks above high water lie off the coasts of Serk.

The Noire Pierre, lying off Banquette point, on the north-east coast, is a small square rock, 11 feet high and steep-to all round.

The Petite Moie, 57 feet high, is a rocky clump steep-to except at its north point, off which, at the distance of 60 feet, there is a sunken rock.

The Grand Moie, lying off Robert point, is a large rocky clump, 91 feet high, dangerous to approach, especially on its eastern side.

The Burons, are a cluster of cragged rocks 66 feet high, in the form of a half moon, rising nearly perpendicular from the sea, steep-to on their south-eastern side, but dangerous to approach from any other quarter. They lie about E.S.E., one quarter of a mile from Le Creux and between them and Serk is the Goulet pass, which dries half-way across at low water springs; the deepest water, 4 feet, being towards Le Creux. Through this pass the tides run with great strength, both ways, but especially about half flood; setting right for and over the Fournier and Grune de Nord rocks, on the north side, and the Pierre Carrée rock on the south side; this pass therefore should not be attempted in a sailing vessel, but on the greatest emergency.

The Conchée, lying about half a mile southward of the Burons, is a square rock, 11 feet high, whitened at the top, having sunken rocks close to all around.

The Baleine rock, in Baleine bay, is 20 feet high, and has a rocky reef extending 70 feet from its north-east side.

Pierre du Cours is a small rock awash at high water, and very steep-to on its south-east side. It is useful as a guide, as its name implies, to vessels passing inside L'Etac de Serk.

L'Etac de Serk is a rocky islet about 200 feet high, lying off the south end of Little Serk. In form it resembles a hay-stack, and is very conspicuous, both from its appearance and position.

On the south-west side of Little Serk are numerous rocks, the most conspicuous of which are the *Moi du Port Goury*, a square-topped rock, 62 feet high; the *Moie de la Bretagne*, a peaked rock, 57 feet high; and the *Moie de la Fontaine*, 57 feet high.

The Givaude rock is described in page 213.

The Moie Batard, a square rock of a whitish colour about 20 feet high, lies off the north-west coast of Brecqhou.

BLANCHARD ROCK, lying nearly $1\frac{1}{4}$ miles eastward of Serk, has only 3 feet over it at the lowest equinoctial spring tides. The marks for it are, the Conchée rock in one with a remarkable cavity, or chasm, called the Convache, to the northward of La Coupée, bearing W. by N. $\frac{1}{4}$ N., and the Corbée du Nez just open southward of the Gorge, a rock at the south-west end of the Petite Moie, N.W. $\frac{1}{4}$ N.

Château point open southward of the Conchée, N.W. by W. $\frac{1}{4}$ W. leads southward of the Blanchard; the Corbirée rock, off the south-west point of Jersey, touching the land about cape Grosnez, S. by W. $\frac{1}{4}$ W.;

leads half a mile eastward; and the northern bluff land on Herm in sight to the north-eastward of the Bec du Nez, N.W., leads to the northward.

Many rocks lie within the Blanchard and to the eastward of the Burons, and between them are several navigable channels, of 10 to 26 fathoms water; they are, however, seldom frequented but by the island boats on account of the impetuous whirl of the tides.

BALEINE BAY, on the south-eastern side of Serk, between the Baleine and the Conchée rocks may be resorted to with great advantage in winter as well as in summer as it affords excellent anchorage in 3 to 7 fathoms, over sand, fine gravel, and broken shells; and shelter from all winds from N.N.E., round by the North to West.

Notwithstanding the numerous outfalls and various discolourations of the water, which appear on all sides on approaching this bay, the only dangers are, the Têtes de la Conchée, the Gripe, the Vingt Clos, the Balmée, and the Demie Balmée.

The **Têtes de la Conchée** have never less than 6 fathoms water over them.

The **Gripe**, lying directly in the fairway of the entrance to the bay, has only 6 feet on it at low-water springs, from which the Conchée is in line with the Goulet rock, N.E. by N., and the Balmée is in line with the Pignon, W. $\frac{1}{4}$ N.

The **Balmée**, which appears at a quarter ebb lies within and to the westward of the Gripe, with the Baleine in line with La Coupée, N. $\frac{1}{4}$ W., and the western side of the Burons touching the outer or north-eastern part of Terrible point, N.E. by E. On this latter line of bearing at the distance of three-quarters of a cable from the Balmée, there is also a small rock called Demie de Balmée, which dries 9 feet at low water.

Vingt Clos Bank, lies 4 cables southward of the Balmée, between it and L'Etac de Serk, and consists of sand and shingle interspersed with rocks; one of these, at the north end of the bank, dries 3 feet at low water springs, at which time two others to the southward have only 3 feet water over them. The south end of La Coupée in line with the Baleine N. by W. $\frac{1}{4}$ W., leads nearly 2 cables north-eastward of the bank; and the Doyle column, on Guernsey, in sight to the southward of L'Etac de Serk, N.W. by W., leads southward. The sand and shingle of this bank is continually shifting; its inclination being entirely governed by the tide and wind.

Directions.—Château point kept open southward of the Conchée will lead into the anchorage of Baleine bay, to the northward of the Gripe; and Serk mill just open West of Château point N. $\frac{1}{4}$ W., will lead into

the southward of it : in both cases anchor when the west extreme of the Burons comes on with Terrible point.

LA GRÈVE de la VILLE, on the north-eastern side of Serk, gives its name to an anchorage affording good shelter for small vessels from westerly and southerly winds, in from 6 to 9 fathoms water ; but the ground being sand and rock the anchor is likely to come home, unless riding with a long scope of cable. It has also this inconvenience attending it, that should the wind suddenly shift to the northward or north-eastward at low water, the tide running for 3 hours to the southward after that period, a sailing vessel could not possibly weather the strong indraught of the Goulet pass, the effects of which are sensibly felt half a mile north-eastward of it, and must therefore ride until the offing tide slacks, or at least if hard pressed, until there is water enough over the neck of the Goulet.

Dangers of La Grève de la Ville.—The Sardrière rock, with 29 feet over it at low water, lies East one quarter of a mile from Bec du Nez. The Jolicot rock, which dries 5 feet at low water, lies S.W. three-quarters of a cable from the Sardrière ; and the Moulinet rock, which dries 8 feet, lies just eastward of Bec du Nez, and only 150 feet off shore. The Jolicot and the Moulinet lie East and West of each other, rather more than an eighth of a mile apart ; there is a safe channel of 6 fathoms water between them, in entering which from the westward be careful to have the peak of the Grande Moie well in sight eastward of Banquette point before hauling in. The peak of the Grande Moie in line with Banquette point clears the Moulinet ; and the same peak over the middle of the Pécheresse rock leads over Jolicot.

The Pécheresse, lying about East, nearly a quarter of a mile from the rifle target, 1874, on the summit of La Grune, covers at high water, but only to the depth of 2 feet ; its inshore point is long and straggling, narrowing the channel between it and the island to a cable.

There is a rock with 7 feet on it lying E. $\frac{1}{2}$ N. nearly a cable from the Pécheresse ; and another, which dries 3 feet, called the Grand Boue, lying E. by S. $\frac{1}{2}$ S. rather more than a cable from it.

The Pavlaison rock, just awash at low water, lies N.E. nearly a quarter of a mile from the Noire Pierre.

Directions.—There are two entrances into La Grève de la Ville ; one from the northward, between the island and the Noire Pierre, and one from the southward, which is very narrow, between the island and the Grande Moie. The marks to lead in from the northward are, the Noire Pierre in one with a remarkable hollowed rock on the shore, the upper part of which has been whitewashed, called La Chapelle, bearing

S.S.W. $\frac{1}{2}$ W., or La Chapelle half a point open eastward of Banquette point, S. $\frac{1}{2}$ W.; between these limits a vessel may also work in. The Noire Pierre is steep-to on all sides but the south.

No particular marks can be given to lead into this anchorage from the southward, that is, between the Grande Moie and the island. There is never less than 3 fathoms in this channel, but as a rock, awash at low water, lies within the Grande Moie, and connected with it under water at a distance of 150 feet, care must be taken to pass through nearer to Robert point, which is steep-to, rather than in mid-channel. There is also at the distance of a cable northward of Robert point, a dangerous rocky reef extending half a cable from the shore; and a half-tide rock at half a cable S.W. from the Petite Moie.

Anchorage.—The east extreme of the Burons just open of Robert point, and midway between Petite Moie and the island, S. by E. $\frac{1}{4}$ E.; outside, or eastward of this mark, the stream runs strong; within or to the westward it is scarcely perceptible. There is good anchorage on the north-eastern side of Serk, outside all the rocks, in 14 to 19 fathoms water, fine clean sand, with St. Martin point, Guernsey, in line with the Corbée du Nez, bearing W. by N., and the Chapelle rock midway between the Noire rock and Banquette point, S. by W. $\frac{1}{2}$ W. This anchorage, however, unless in fine weather, is only tenable with the wind between West and S.S.W.

BANQUETTE BAY, on the north-western side of Serk, affords good shelter against easterly south-easterly and southerly winds, in 5 to 10 fathoms water, over coarse sand interspersed with small black stones and pieces of sea-weed. Should the wind chop round to the westward, a vessel at anchor here, would even then be able to weather the Bec du Nez; and may from thence push to sea, or haul under the lee of the island.

Dangers in this bay are the Epissures rock, with 13 feet on it at low water springs, lying N.W. a quarter of a mile from the Autelêts rocks. Between the Epissures and port du Moulin there are several dangerous rocks.

The Guillaumez rock, which covers 6 feet at high water, lies E. by N., rather more than a quarter of a mile from the Epissures, and about half a cable off shore.

The Grune de Gouliot, with 6 feet over it at low water, lies north a quarter of a mile from the east end of Brecqhou.

The Petite Banquette is a narrow bank of fine sand with a sharp ridgy apex. It is about a quarter of a mile in extent, north and south, and has 16 feet on the shoalest part near the middle, from which the Platte Roque, off port du Moulin bears E. $\frac{1}{2}$ S. distant 2 cables. In heavy

gales from the north-eastward or westward, this bank has been reported to shift a cable or more in one tide, which here runs to the south eastward from low water till half flood, and to the south-westward from half-ebb till low water.

Anchorage.—The best deep water berth in Banquette bay is in 9 fathoms, with Givaude rock in line with Moie Batard, S.W. by W. $\frac{1}{4}$ W.; Little Serk mill (without vanes) in line with west side of Gouliot island, S. $\frac{1}{4}$ W.; and Manor tower and north cliff of port du Moulin in line, S.E. $\frac{1}{4}$ E.

LA GRANDE GRÈVE is the name applied to the anchorage on the south-western side of Serk, between Brecqhou and Little Serk. It takes its name from the great beach of fine white sand under La Coupée uniting Great with Little Serk. The approach to it is much encumbered with rocks, but there is plenty of room notwithstanding, and good shelter from S.S.E., East and N.E. winds, in 7 to 11 fathoms water, fine sandy bottom with pieces of shells. It would not, however, be prudent for a sailing vessel to remain at anchor here should the wind shift either to the northward or southward of the points above specified; for the W.S.W. wind, from the long fetch it commands, brings in a heavy swell; and the obstruction caused by the weather tide coming through the Gouliot pass, raises it to such a height, as to preclude the possibility of a vessel riding out even a moderate gale.

Should a vessel, therefore, be unavoidably caught by a westerly wind at this anchorage, she should immediately endeavour to get out either to the westward, or through the Gouliot pass, which latter may with confidence be attempted at half flood.

Dangers off La Grande Grève:—The Hautes Boues are a group of rocks lying off the north-west side of Little Serk. The outer, north-west rock of the group dries 4 feet at low water, and lies N.W. by W., three eighths of a mile from the Moie de la Fontaine: there is deep water close to this rock to the northward and westward, but a string of dangerous rocks extend from it in a S.S.W. direction, to the distance of nearly half a mile; there are also numerous rocks within this line to the eastward, five of which dry at low water.

There is no safe channel for large vessels inside the Hautes Boues.

The Dents, a rocky clump off the south-west end off Brecqhou, are awash at high-water ordinary spring tides. They are steep-to and safe of approach from the southward.

The Baveuse is a large rocky clump lying N. by E. rather more than a cable from the Moie de la Fontaine. It covers 4 feet at high water.

From the Baveuse in the direction of the Gouliot pass, there are several dangerous rocks, the chief of which, the Boue de Baie, has only 3 feet on it at low water, from which the Baveuse bears S.S.W. $\frac{1}{4}$ W. distant $1\frac{1}{2}$ cables; the Chapelle, a large rock to the northward of Le Jeu point, is in a line with that point; and the Pierre au Norman appears in the middle of the chasm between the Moie du Gouliot and the islet called La Tour.

Directions.—The mark to lead to the inner anchorage in La Grande Grève, northward of the Haut Boues and southward of Boue de la Baie, is the south end of La Coupée in line with Le Jeu point. Serk mill in line with the gap in the outer part of Longue point bearing East, will lead southward of the Dents and northward of all the dangers in Grande Grève, until the Pierre au Norman comes in line with the east end of Brecqhou, which mark will lead to the southward into the anchorage. The best mark for anchoring is with the Pierre au Norman in line with the east point of Brecqhou; and about two-thirds of La Coupée roadway open southward of the south-east point of Great Serk. Should it be desired to anchor farther out, a good position will be obtained by bringing Serk mill in line with Longue point bearing East, and the Givaude between Brecqhou and the Dents.

It should however be observed that as Serk mill will be hid behind the intervening high land of Longue point before a vessel arrives abreast of the Dents, it will be necessary to look out in time for another object on the same line of direction.

Tides around Serk.—It is high water, full and change, at Serk, at the same time as at St. Peter Port, viz., at 6h. 37m., and there is about the same rise and fall, page 193. The streams in the immediate vicinity of the island are subject to a great variety of courses during the twelve hours; their direction being governed by the peculiar configuration of the land. On its north-eastern side there is a tract of water in which a perpetual eddy or slack tide exists, during the six hours that the stream occupies in running to the north-eastward in the Great Russel and the Déroute channels, extending nearly 3 miles from the land, and gradually contracting in breadth as it increases its distance from the shore. The marks for its north-western and south-eastern limits are, the west end of Brecqhou island in one with the Corbée du Nez; and l'Etac de Serk just appearing to the eastward of the land at Le Creux. Outside of the intersection of these marks even at the distance of a cable, run the true Russel and Déroute streams.

The streams in Balein bay, in Terrible bay, and in the neighbourhood of the Conchée, Baleine, and Balmée rocks, runs $7\frac{1}{2}$ hours to the eastwards,

and only $4\frac{1}{2}$ hours to the south-westward. The former stream begins an hour after low water by the shore and runs until $2\frac{1}{2}$ hours ebb, when the south-western stream commences and runs faintly for the remaining $4\frac{1}{2}$ hours or until an hour after low water again.

The streams on the north-eastern side of Serk, in La Grève de la Ville and in the neighbourhood of the Grande and Petite Moie rocks, &c., run $8\frac{1}{2}$ hours to the S. by E. and only $3\frac{1}{2}$ hours to the N. by W. The southern stream commences at 4 hours flood and runs until half an hour after low water, when the northern stream commences and runs faintly for the remaining $3\frac{1}{2}$ hours, or until 4 hours flood again.

The southern stream above mentioned, on the north-eastern side of Serk, and the northern one on the south-eastern side, branch off circuitously to the eastward of the Burons, where they meet and unite with the Déroute stream, which sets directly both ways, and runs for equal spaces of time. A curved line drawn from the Grune Noire towards l'Etac de Serk to the southward, and to the point of intersection* before mentioned, on the north-eastern side of the island, will divide the irregular streams in-shore from that of the Déroute; and this line continued from the above point of intersection close round the Bec du Nez towards the Givaude rock, and thence to within 4 cables of l'Etac again, will divide the regular Russel stream from the irregular one within it.

The stream on the north-western side of Serk begins to run to the southward at the Bec du Nez, and thence along the land towards Brecqhou island at three-quarters flood near which it meets with the stream from the Gouliot pass; which latter prevailing over the former, carries it circuitously into the Great Russel to the north-westward, where it unites with the regular stream. The stream begins to run to the north-eastward, along the shore of the Moie du Gouliot towards the Bec du Nez, at three-quarters ebb, and so continues until three-quarters flood again.

The stream on the south-western side of Serk in the neighbourhood of the rocks called the Hautes Boues, Bretagne, Sercul, &c., runs $4\frac{1}{2}$ hours to the northward, and only $1\frac{1}{2}$ hours to the southward; the former stream commences at half-flood and runs for one hour; it then suddenly turns and runs to the south-eastward for $1\frac{1}{2}$ hours, or until half an hour before high water by the shore, at which time it again as suddenly veers to the northward, and sets in that direction for the remaining $3\frac{1}{2}$ hours, or until half ebb.

* These two marks do not exactly intersect each other until considerably beyond the eddy here alluded to. Vale mill, however, in line with the Sardinias rock—on the east side of Herm—terminates its boundary.

The stream in the Gouliot pass runs for equal spaces of time, similar to that in the Great Russel, and does not partake of the apparent irregularity which governs the tides in its vicinity. On the contrary, the force and shape of the flood stream, acquired by the contracted and peculiar form of the channel between Serk and Brecqhou, is continued until it falls into the Russel channel; the same is the case with the ebb until it unites with the stream to the south-westward of the Hautes Boues.

CHAPTER VI.

THE CASQUETS ISLETS; BURHOU ISLAND; ALDERNEY ISLAND AND
RACE; AND BANC DE LA SCHOLE.

VARIATION IN 1882, 19° WEST.

THE islands and rocks which occupy a large portion of the space between Bréhat island and cape de la Hague, extend to the northward as far as the parallel of that cape, where they form a sort of chain 9 miles long from west to east, and 3 miles wide from north to south. This chain forms three distinct groups, namely, the Casquets islets and rocks lying at its western extremity, the island of Alderney at the eastern, and Burhou island occupying the centre position. They are separated from the coast of France by a channel 8 miles wide, called the Race of Alderney, and in a similar manner from the island of Guernsey and its islets by a space of about 12 miles.

CASQUETS ISLETS and ROCKS,* so named, probably, from their remarkable helmet or cap-like appearance, lie N.W. by W. $\frac{1}{4}$ W., 6 miles from Alderney old telegraph tower, and form an isolated group half a mile in length W.N.W. and E.S.E. by one to 2 cables in breadth. The largest and highest of the rocks form a clump near the centre of the group on which the lighthouse and towers are built; they are elevated 90 feet above high water, and at low water are all connected together, extending 3 cables W.N.W. and E.S.E. by $1\frac{1}{2}$ cables across their widest part, which lies N.N.E. and S.S.W. from the lighthouse. From this central mass to the eastward for $1\frac{1}{2}$ cables lie six high rocks detached from each other at low water by narrow gullies, through which the tide rushes with great velocity; the easternmost rock is named Colotte, it is elevated 33 feet above high water, is very steep-to, and safe of approach.

The entire group above described is as steep as a wall to the southward, and also to the eastward, but on the north side, between point Colotte and the lighthouse, are two small detached heads that uncover at low water, they are, however, only a quarter of a cable distant from the main clump.

* See Admiralty plan 1—Alderney and Casquets, No. 60; scale, $m=4$ inches.

Landing.—The little Casquet rock, situated three-quarters of a cable to the southward of the lighthouse, and elevated 53 feet above high water, shelters a landing-place for boats on the main rock, at an inlet named Petit Havre ; there is also a landing-place on the east side of the little Casquet rock, and another in a rocky bight on the north side of the main group.

The possibility of safe landing at either of these places is communicated to a vessel approaching, by the hoisting of a flag on the platform staff between the towers. When landing can be effected at Petit Havre, or S.W. cove, a blue flag is hoisted ; when at south cove, St. George's Ensign ; and a red flag for the N.E. landing-place in north-east cove. When no flag is shown the landing is not considered to be safe.

L'Auquière Rock, lying three-quarters of a cable W.N.W. from the west end of the main group, is one-third of a cable in diameter, and elevated 44 feet above high water. Sunken rocks extend to the distance of a third of a cable to the north of L'Auquière, as well as to the westward and southward of it. There is a boat channel between it and the Casquets, but it is very narrow, owing to a ledge of sunken rocks extending nearly half-way across from west point of Casquet group, and rendered further dangerous by other rocks to the southward, which dry at low water ; it should never be used, therefore, except in cases of urgent necessity.

Noire Roque, or Black Rock, lies West $3\frac{1}{2}$ cables from the Casquet towers, and W. by S. $\frac{3}{4}$ S., nearly 2 cables from L'Auquière ; it is a quarter of a cable in diameter, and elevated 12 feet only above high water ; it is craggy and unapproachable.

Noire Roque Ledge, having only 8 feet over it at low water, lies N.W. $\frac{1}{2}$ W., $1\frac{1}{4}$ cables from Noire Roque. Its position is generally pointed out by a strong ripple, and with any swell the sea breaks furiously over it.

There is a sunken rock with only 4 feet over it, midway between Noire Roque and L'Auquière ; no vessel ought, therefore, to attempt to pass between them.

Excepting the dangers just noticed and above, the Casquets are very steep-to on all sides.

Anchorage can only be safely attempted on the south-east side of the Casquets by a steam vessel ; and in her only while the south-western stream is running. The best spot is in 15 fathoms, fine sand ; the north-east tower bearing N. by W. ; and fort Albert in line with Ortac, and between L'Equêt and Fourquie rocks.

This position, although only $1\frac{1}{4}$ cables from the rocks, is quite safe in fine weather when carefully taken up ; it is sheltered from the tide by

the Casquet rocks. At the distance of 100 yards within it the depth is 8 fathoms, and at the same distance outside 23 fathoms.

LIGHT.—Near the centre of the Casquets, on the highest rock* stands a stone lighthouse, 75 feet high, coloured white, which exhibits at an elevation of 120 feet above high-water a *flashing* light (*triple half minute*), the light shows three successive flashes of about *two seconds* duration each, divided by intervals of about *three seconds* of darkness, the third flash being followed by an eclipse of about *eighteen seconds*. The light should be visible in clear weather from a distance of 19 miles.

Fog Signal.—During thick or foggy weather a powerful siren trumpet will give three blasts of *two seconds* duration each, in quick succession *every five minutes*. Between the first and second blasts, and between the second and third, intervals of three seconds occur.

CAUTION.—The great strength of the tidal stream near these rocks renders an incautious approach to them during foggy weather extremely hazardous; it is therefore recommended at such times never to run for them with the tide, but either to wait for slack water, or until the stream in its usual rotary course turns from the desired direction, or by altering the position of the vessel, a stream of the rocks to leeward, so as to approach them against the tide. Should a shoal cast be obtained when running for the Casquets in thick weather, the vessel's head should be immediately turned against the tide; after which, haul out cautiously into deep water.

Eight Fathoms Ledge.—N.W. by W. $\frac{1}{2}$ W., nearly three-quarters of a mile from L'Anquière, is a bank of sunken rocks, on which the least water obtained was 13 fathoms, but there is said to be as little as 8 fathoms. The bank is from 40 to 50 yards in extent, and rises suddenly from soundings of 25 and 27 fathoms water, and although it cannot be touched upon by vessels of large draught, yet it is dangerous, for at all times it causes violent eddies, and during fresh winds the sea breaks upon it.

ORTAC CHANNEL is bounded on its eastern side by Ortac ledge, and the rocks extending from Renonquet and Verte-tête, with Speedy rock on the same side as its northern boundary; and on its western side by the eastern Pommier bank, Danger rocks, and L'Equêt reef. There is a rock near the middle of this channel, called Dasher rock, with $6\frac{1}{4}$ fathoms over it; vessels may pass on either side of this rock, but that to the eastward is preferable. The northern entrance of the Ortac channel,

* Previous to the year 1877 three lights were exhibited from three separate towers built on this rock. These lights occupied a triangular position with respect to each other, the vertex of the triangle being to the south. The present light is exhibited from the north-west tower, which has been raised; the east tower, reduced in height, is now a fog-horn house, and the south tower, also reduced in height, is a store house.

between the eastern Pommier bank and Speedy rock, is rather more than a mile wide; its narrowest part, to the eastward of Dasher rock, is nearly three-quarters of a mile; at this part the Great Nannel appears a little open on the north side of the high head of Renonquet, bearing E. by S., this mark will lead over the Dasher rock; on the top of which the outer high rock Les Etacs is seen touching the north-east side of Ortac.

The general depth in this channel is about 15 fathoms, with tolerably regular soundings, but the bottom is rocky and foul throughout; anchorage, therefore, except in cases of most urgent necessity, is not to be thought of.

The tides here run with great strength, especially when near high or low water; at springs they attain a velocity of more than 7 knots; in the course of their rotary motion they set across the channel, and although when running in this direction their strength decreases, an incautious pilot might soon be taken amongst dangerous rocks. From these and previous remarks it will be seen that these channels are at all times very dangerous for sailing vessels, and even for steamers, without the persons navigating them possess considerable local knowledge.

Directions.—To pass through the Ortac channel from the northward, bring Ortac to bear S. $\frac{1}{2}$ E., and steer direct for it on this line of bearing; and when Great Nannel comes in line with Verte-tête E. by S. $\frac{1}{2}$ S., steer S.S.W. $\frac{1}{2}$ W.; which course will lead through the channel about a third of a mile to the westward of the outer part of Ortac ledge. As stated before, when Great Nannel comes nearly on with the north part of the highest head of Renonquet E. by S., a vessel will be abreast Dasher rock, to the southward of which the deep water channel is nearly two miles wide. When bordering on Ortac, the ledge off it will be cleared by not bringing Great Nannel nearer to Burhou reef than the middle of the water gap, or channel between it and Renonquet, until fort Albert opens southward of Ortac. When Noire Houmet is seen to the southward of Ortac, a vessel will be clear of L'Equêt and all danger to the southward.

Fourquie and L'Equêt Rocks.—A bank of pebbles, sand, and broken shells, with 6 to 10 fathoms water over it, extends to the distance of nearly a mile E.S.E. from Colotte point; Fourquie is near the western end of this bank, and L'Equêt near its eastern end. L'Equêt is rather a long straggling and dangerous rock; its northern head is the highest part and dries 7 feet at low water; this head bears from the north-east Casquet tower S.E. by E. $\frac{3}{4}$ E., $1\frac{1}{10}$ miles. There is a detached rocky bank at the distance of a third of a mile to the eastward of L'Equêt. Fourquie rock dries 13 feet at low water, and is steep-to, excepting to the eastward, where there is a detached sunken rock. Fourquie bears

S.E. by E. $\frac{1}{2}$ E. more than half a mile from the north-east tower, and S.E. one quarter of a mile from Colotte point.

There is no safe channel between Fourquie and L'Equêt rocks, nor is it safe to approach the east side of the latter nearer than half a mile. Whirling eddies, thrown up by the tide rushing over the rugged bottom at these parts, render a vessel involved in them quite unmanageable. The tide sets fairly through the channel between Fourquie and Colotte point, and there is 10 fathoms water over a tolerably even bottom in it; therefore a steamer can safely pass through in fine weather; but near spring tides, with any swell on, prudence would suggest not attempting it except in cases of urgent necessity.

POMMIER BANKS consist of two extensive and very dangerous groups of sunken rocks, divided by a narrow channel, having 12 fathoms in it. The highest head is situated near the west end of the westernmost group; it has only 13 feet on it at low water, and lies E. by N. $\frac{1}{4}$ N., $1\frac{1}{2}$ miles from the Casquets: on it Ortac appears midway between Alderney telegraph tower and the south-western brick kilns S.E. $\frac{1}{2}$ E., and the north-eastern and south-western Casquet towers are nearly in line, bearing W. by S. $\frac{1}{4}$ S. From this 13-foot rock, the east end of the eastern bank bears E. $\frac{1}{2}$ S. one mile. The least water found on this bank was 5 fathoms, but there may be 2 or 3 feet less.

To clear the Pommier banks—The north-eastern and south-eastern Casquet towers in line bearing S.W. $\frac{1}{2}$ W., lead three-quarters of a mile outside or to the northward. The Noires Putes midway between Ortac and Renonquet S.S.E., leads nearly half a mile to the eastward; and St. Anne's church-steeple, in line with Ortac S.E. by E. $\frac{1}{2}$ E., clears them half a mile to the south-westward. This latter mark is also the best line to enter the Ortac channel with, between Pommier and L'Equêt rocks.

Danger Rocks, having 21 feet over them, lie three-quarters of a mile within the Pommier bank, and E. $\frac{3}{4}$ S. 2 miles from the Casquets. These rocks are very little more than half a cable in extent in an east and west direction, but there may be a few feet less water over them than that given above; they must therefore be approached with caution.

The channel between Danger rocks and L'Equêt bank has 15 fathoms in it, and is nearly three-quarters of a mile wide; it is therefore quite safe to take in a vessel under perfect command, during fine weather; but in bad weather, more especially if it happen near a spring tide, no vessel should attempt it; indeed at such times, neither this nor any of the channels between the Casquets and Ortac should be used, for then the entire space is covered with tremendous overfalls, in which the largest vessels if involved would be quite unmanageable; even during fine weather there are overfalls, but they are then confined to the shoalest

parts over the high rocky heads, and thus marking their positions are easily avoided, at this time therefore, they contribute to the safety of the navigation.

ORTAC ROCK.—At $3\frac{1}{2}$ miles E. by S. $\frac{3}{4}$ S. from the Casquet light, lies a remarkable huge nearly inaccessible rock, named Ortac, which rises 79 feet above high water, and may be seen in clear weather 9 or 10 miles. Its southern side is steep-to, having 8 fathoms within half a cable of the rock, but a sunken ledge with but 11 feet on it at its outer extreme extends to the distance of $1\frac{1}{4}$ cables N.W. by W. of the rock, and lies with Clonque fort just in sight to the southward of Ortac. The highest part of this ledge to the south-westward with 14 feet on it, lies with fort Albert flagstaff just in sight to the southward of Ortac E. by S., three-quarters of a cable from the latter. To pass to the westward of the ledge, keep fort Albert flagstaff open south of Ortac until Verte-tête bears E.N.E.

Between Ortac, Verte-tête, and Burhou island, are scattered many dangerous sunken rocks and ledges, near and amongst which the streams run with great velocity.

Speedy Rock, lying nearly half a mile due North of Verte-tête, marks the northern boundary of the Ortac channel to the eastward; the shoalest spot found is in 33 feet at low water; at this position the outer high rock of Les Etac is in line with the high central rock of Renonquet S. by E. $\frac{1}{2}$ E., and the whole of fort Albert, its apparent breadth open to the southward of Great Nannel S.E. by E.

CASQUET S.W. BANK lies S.W. 4 miles from the Casquets lighthouse, and consists of a bank of fine gravel, sand and shells, $3\frac{1}{2}$ miles long in a N.N.E. and S.S.W. direction and nearly a mile wide.

The most elevated part of the bank lies close to its western side, near the middle; the 10-fathom contour line here includes a space just 2 miles long, and barely a quarter of a mile wide; the shoalest part with 4 fathoms lies half a mile within, or to the north-eastward of its south-west end. At this position the north-east Casquets tower bears N.E. $\frac{1}{4}$ E., $4\frac{1}{2}$ miles. Alderney telegraph tower East, Doyle column in line with the north-east extreme of Guernsey, S.W. $\frac{3}{4}$ S.

Doyle column in line with Vale mill, S.W. by S., leads rather more than a mile to the westward of S.W. bank. The channel between S.W. and S.S.W. banks is 2 miles wide, and has 22 to 29 fathoms in it.

CASQUET S.S.W. and S.S.E. BANKS, are steep ridgy banks of fine sand, lying within and to the eastward of S.W. bank and nearly across the Ortac channel to the south-west; all these banks are apparently formed by a deposit caused by the turning of the stream between low water and half flood; for at this period near them the last

of the westerly channel stream, after passing between Ortac and the Casquets, meets the south-easterly tide, then prevailing to the south-westward of the Casquets. The north point of the S.S.W. bank, with 18 fathoms, bears S.W. $\frac{1}{2}$ S. $1\frac{1}{2}$ miles from the Casquet light, and from this it extends due south rather more than $1\frac{1}{2}$ miles; after which the water deepens, and the tail of the bank turns off to the eastward. This bank is a quarter of a mile broad, taking the 20-fathom line; it has a short ridgy apex, fine white sand, having a depth of 12 to 13 fathoms over it, with 11 fathoms on the shoalest part near the middle.

Taking the 20-fathom line as a contour, the Casquet S.S.E. bank is rather more than 3 miles long in a N.E. by E. and S.W. by W. direction, and three-quarters of a mile wide; its south-west end after the water deepens to 18 fathoms, turns off to the N.W., and unites with the S.S.W. bank. A narrow ridge of shoal water runs along the middle of the S.S.E. bank, a mile in extent; having $4\frac{1}{2}$ fathoms at its east end, and only 4 fathoms at its west end; with irregular soundings of 5 to 8 between. The Clonque and Tourgis forts beacons in line E. by N., the same mark as for Pierre au Vraie, passes over the top of the bank midway between the shoal spots at its extremes. At the north-east extreme of the 10-fathom contour the Casquets lighthouse bears N.N.W. $\frac{1}{2}$ W. $2\frac{3}{4}$ miles, and at the south-west end of the 10-fathom contour, the Casquets bear N. $\frac{1}{2}$ W. $3\frac{1}{2}$ miles.

The shoal spots on the bank are difficult to pick up, they being generally the summits of sharp ridges of sand, and very steep; these ridges appear to run rather across the bank, or in an E.S.E. and W.N.W. direction, but they shift in all probability with the turning of the tide.

Anchorage should not be attempted on the S.S.W. bank, unless in case of necessity, there being at all times a strong ripple over it; but the S.S.E. bank may in fine weather be used with great advantage by vessels cruising in the vicinity. The north-east shoal spot on this bank with 28 feet, lies with Tourgis beacon over the middle of Clonque fort E. $\frac{3}{4}$ N. The best anchorage will be found in from 6 to 10 fathoms, with Ortac midway between Renonquet and Verte-tête N.E. $\frac{1}{4}$ E., and Casquets N. by W. $\frac{3}{4}$ W.

To clear the S.S.E. Casquet bank outside the 10-fathom line, and to the southward, keep L'Etac de la Quoire open half a point to the southward of the Orbouée rock E. $\frac{1}{2}$ N. To the northward, the inner top of the Great Coque Lihou touching the north side of the Coupé E. by S. $\frac{3}{4}$ S., will lead clear in 10 fathoms, at the distance of more than half a mile from the northern shallow spot on the bank.

Verte-tête, behind the Ortac N.E. $\frac{1}{2}$ N. leads clear to the eastward; and the east side of Renonquet in line with the east side of the Ortac N.E. by E. will clear to the westward.

CASQUET MIDDLE BANK lies about midway between the northern parts of the S.S.W. and S.S.E. banks ; it is about one-third of a mile in diameter, and has 15 to 20 fathoms on it, with gravel and broken shells.

The general depth of water round all the Casquet banks is from 22 to 25 fathoms.

Tides.—It is high water, full and change, at the Casquets and at the Ortac rock at 6h. 45m. ; equinoctial springs rise 24 feet, ordinary springs 15½ feet, and neaps 10 feet.

Although the tidal stream in the immediate neighbourhood of the Casquets preserves its rotary propensity, it varies much in strength and direction according to position. On their north side and to the eastward, for instance, outside the influence of the Ortac channel, the slack and change of stream takes place as in the offing ; the great body of the flood, setting E. by N. and the ebb W. by S. ; but westward of the Casquets the strength of the stream is principally felt in three different directions, namely, at 2½ hours flood South 3·7 knots, 1 hour ebb E.N.E. 3·0 knots, and an hour before low water W. by N. 3·1 knots ; between these points a continuous stream of tide sets to the westward, southward, and eastward, the only slack occurring between 3 and 4 hours ebb.

On the south-western side of the Casquets, between the periods of half-ebb and low water, there is an eddy of nearly 2 miles in breadth and of considerable strength. Between low water and 2 hours flood this eddy revolves more to the eastward, as well as increases in breadth ; the natural consequence of the obstruction which the Casquets present to the stream being in the latter case increased, because acted upon more directly than in the former ; and this eddy continues until gradually weakened and destroyed by the current at half-flood. Similar eddies exist also on the north-eastern side of the Casquets, the effects of which are exactly the reverse of the preceding.

The stream in the Casquet channel, that is in its immediate draft, begins to set to the south-westward at half-ebb exactly on the shore, and runs in that direction for 6 hours, or until half-flood, and the contrary with respect to the north-eastern stream, for there is neither high nor low water slack here. The stream which begins to run to the north-eastward at half-flood, after passing the Ortac, gradually veers to the northward and sets N.N.E. until it again unites with the stream flowing round the northern side of the Casquets. The south-western stream of this channel, which commences at half-ebb, sets right over the L'Équêt and the Fourquies, to avoid which the utmost care must be taken.

On the south-western side of the Ortac rock there is an eddy of nearly 1½ miles in extent, between half-ebb and one hour's flood ; after which

period the stream on the south side of Ortac gradually inclines to the westward, setting, at 2 hours flood, directly for the Casquets, until its progress is arrested by the last of the south-western stream in the Casquet channel. There is no eddy of consequence on the north-eastern side of Ortac.

BURHOU ISLAND lies E. $\frac{1}{2}$ S. $1\frac{1}{2}$ miles from Ortac ; it is rather level within, although huge rocks crop out near the extremes, and it is fringed with reef. The western part of Burhou is cut off from the main island by the tide at high water ; the portion thus detached is called Little Burhou. The two islands together are rather more than half a mile long in an east and west direction, and nearly 2 cables broad, their rocky peaks being about the same height, 83 feet above high water. The islands are covered with a light soil, on which grow coarse grasses and a variety of wild flowers, the soil is burrowed in every direction by rabbits, which animals, being now nearly extirpated by the fishermen of Alderney, their holes are frequently occupied by sea birds engaged in rearing their young ; among others it is the resort of the stormy petrel during the breeding season.

There is a house of refuge for fishermen and shipwrecked mariners, on the low saddle near the middle of the island, but it is now fast falling to ruin (1870). The landing places are in two small coves near the house, one on either side of the island. There is no fresh water on the island other than may be deposited by the rain in the interstices of the rocks.

The eastern side of Burhou is clear of danger to within half a cable from the shore, but a reef stretches out to the westward of Little Burhou for half a mile, and the whole of it, with the exception of a few elevated rocky heads, covers at high water. There are also numerous detached rocks along the border of this reef to the southward, and also to the westward.

There is a 5-fathom channel between Burhou reef and the rocks stretching out 3 cables to the westward of Ortac ; there is also a very narrow channel to the northward of Burhou reef leading into the little Swinge, but only the most expert pilots amongst the Alderney fishermen could navigate either of them with safety.

VERTE TÊTE REEF, lying to the north-eastward of Ortac, marks the north extreme of the dangerous rocks, stretching in a north-westerly direction to the distance of a mile from the west end of Little Burhou. There are three high rocks on this reef, of which the most remarkable, called Cone rock, lies to the westward ; bearing N.E. $\frac{3}{4}$ N., five-sixths of a mile from Ortac rock, and E. $\frac{3}{4}$ S., rather more than $3\frac{1}{2}$ miles from the Casquets. It is of sugar-loaf form and elevated about 20 feet above high water ; is detached from the main reef at all times of tide ; very steep to the northward, but to the westward, at a distance of three quarters of a cable, there is a small pointed rock that uncovers 6 feet at low water.

The main rock of the Verte-tête group is 13 feet higher and much larger than Cone rock ; it has, moreover, two heads; the inner and higher is very flat on the top ; the outer situated a quarter of a cable to the north-eastward being lower, smaller, and peaked. A reef, dry at low water, extends nearly a cable to the eastward of the high head of Verte-tête; there is also a sunken rock, bearing E.N.E. about a cable from it ; but with the exception of these dangers and the rock above described, situated to the westward of Cone rock, the Verte-tête rocks, that are always above high water, are very steep-to on the outside.

Renonquet reef, lying in an east and west direction, at a quarter of a mile within the Verte-tête, is nearly three-quarters of a mile long ; its western end is low and covers with the tide for the third of a mile, but near the eastern end there is a group of high rocks, about $1\frac{1}{2}$ cables in diameter, that never cover. The highest rock of this group is elevated 40 feet above high water, and lies nearly a third of a mile within the high head of Verte-tête, on a line between it and the peak of Little Burhou.

White rock is about 2 cables to the eastward of Renonquet ; it is small and elevated 20 feet above high water ; steep-to and safe of approach to the northward. There is only another rock situated to the eastward of this, near the Renonquet group, visible at high water, and this is a small head nearly awash lying S.E. by E., $1\frac{1}{2}$ cables from White rock ; therefore, the White rock on the east, Verte-tête to the westward, with the Renonquet rock in the middle, together form a remarkable group to guide the mariner set in here during foggy weather.

Les Maquereaux Rocks.—A sunken reef, 2 cables in extent north and south and a cable broad, lies half a mile East from White rock ; there are three heads near the middle of the reef with only 4 feet over them at low water, and no proper channel for vessels between these rocks and Verte-tête. Outer L'Etac, in line with the saddle rock of Burhou just to the westward of the house, bearing S. $\frac{1}{2}$ W. leads clear of Les Maquereaux rocks to the east, and the Casquet towers their apparent breadth open northward of Verte-tête W. $\frac{1}{2}$ N. leads one cable to the northward of them. The eastern clearing mark for these rocks is also the best line to run in for the anchorage on the north side of Bourhou, should necessity compel a vessel to use it ; in such a case, anchor in 7 fathoms sand, with Outer L'Etac between the above leading line and the high western apex of Burhou ; and Ortac in line or just within the northernmost high-water head of Burhou reef.

The Nannels, said to be an English corruption of Les Nianaise, is a reef about one-third of a mile long east and west, and one quarter of a mile wide ; it may be said to form the eastern part of Burhou group, and

consists of enormous rocks, curiously shaped, some which are always above water and others that cover and uncover with the tide. The highest, called the Great Nannel, rises 58 feet above high-water, and is situated near the middle of the south-western part of the reef. The next in magnitude, called the Little Nannel, is elevated only 12 feet above high water, and lies at the north-western end of the reef, rather more than one cable distant from the Great Nannel.

Other rocks above high water, but of lesser magnitude, lie in an easterly direction from the Great Nannel for the distance of 2 cables; the extreme point of the group is called Pierre de Bût; this part of the rock covers with the tide near high water. There are also two sunken rocks, having 9 feet over them, lying one-third of a cable to the eastward of Pierre de Bût.

Le Cordonnier, a small rock drying 3 feet at low water, lies at the distance of $1\frac{1}{2}$ cables south of the Great Nannel.

The breadth of the channel between Burhou and the Nannels is exactly 2 cables, and is divided into two parts by a rock near the middle called L'Equêt, which dries 6 feet at low water. The tide rushes through this channel into the Little Swinge with great velocity.

L'Emprone Reef lies N.N.E. a third of a mile from the Great Nannel; it is nearly $1\frac{1}{2}$ cables long east and west by three-quarters of a cable wide: there are 4 rocks which dry at low water; the highest 2 feet, and others awash. The sea breaks furiously on this reef, especially with fresh north-westerly winds.

Round Rock dries 9 feet at low water, and lies midway between the Nannels and L'Emprone.

To clear L'Emprone and the Nannels, to the northward and eastward, keep the Casquet towers open to the northward of Verte-tête, W. $\frac{1}{2}$ N., until Alderney mill opens to the eastward of the Grosse rock, S. $\frac{3}{4}$ E.

The SWINGE CHANNEL divides Burhou island and its rocks from Alderney; its narrowest part is included in the space, bounded by the rocks fringing the south shore of Burhou island on one side, and the Barsier and Corbet rocks to the southward. It is here three-quarters of a mile wide, but on either side of these points it soon widens. The bottom is rocky throughout, and very uneven; the average depth at its narrowest part cannot be taken at more than 8 fathoms. There are several very dangerous rocks in the Swinge, some lately discovered, which will be noticed hereafter. This, like the Casquet channel, abounds with broken water, even during the calmest weather, caused by the rapidity of the stream and the rugged bottom. There are also two overfalls in it, caused solely by the tide, the dangers of which are of course much increased in bad weather. During easterly winds, on the north-east stream, overfalls

extend nearly across the Swinge, from Burhou island to the outer end of Alderney breakwater. With westerly winds on the south-west stream, they extend from Ortac to Les Etacs. Both overfalls may be avoided by following the directions given hereafter.

DANGERS in the SWINGE.—Les Boues des Kaines, the outer head, is awash at low water, and lies S.W. by S., distant 3 cables from the high water rocky clump at the south-west end of Burhou reef; on it fort Albert flagstaff is seen just inside the outer end of Grosnez fort, E. by S. $\frac{1}{4}$ S., and Long rock a little open westward of the south-west rocky clump of Burhou reef, N.N.E. $\frac{1}{4}$ E.

The channel inside these rocks is barely $1\frac{1}{2}$ cables wide.

North Rock, 11 feet, lies $1\frac{1}{2}$ cables to the S.E. of Noire Houmet, off Burhou island; on it the Great Nannel is seen in the gap just within the easternmost, high, semi-detached rock of Burhou, bearing N.N.E. $\frac{1}{4}$ E., and Ortac just open southward of the half-tide reef, south-west of Noire Houmet W. by N. $\frac{1}{4}$ N.

South Rock, 5 fathoms, lies with the west end of Great Noire Pute touching the east side of inner Les Etacs, S. $\frac{3}{4}$ E., and the outer or northern upper extreme of fort Albert a little open to the southward of the inner part of Grosnez fort, E. $\frac{3}{4}$ S. There is another head with $5\frac{1}{2}$ fathoms over it, situated at the west end of this same rocky bank; it bears from South rock S.W. by W. $\frac{3}{4}$ W., $2\frac{1}{2}$ cables.

Both of these heads may have less water than is here given; in approaching them from the westward, it will be useful to remember that you cannot touch the western head so long as the Great Noire Pute is in sight, westward of Les Etacs; and proceeding to the eastward, you are clear of the eastern head as soon as the whole of the Great Noire Pute is seen clear of the inner of Les Etacs.

Les Etacs Bank lies nearly half a mile W.N.W. from the Etacs; the least water found 26 feet, lies near the south end of it. This bank will be cleared outside by keeping the Great Noire Pute open to the westward of Coupé rock until Tourgis beacon comes near the north end of Clonque fort.

Pierre au Vraic.—This dangerous rock, which dries 5 feet at low water, lies immediately in the stream of the Swinge channel, 4 miles S.E. $\frac{1}{4}$ S. from the Casquets, S. by W. nearly $1\frac{3}{4}$ miles from Ortac, and West, exactly $1\frac{1}{2}$ miles from Les Etacs, near the west end of Alderney. In form and size this rock is like a small boat bottom up; it is surrounded by very deep water; at the distance of $1\frac{1}{2}$ cables to the southward and westward there are 26 fathoms, and within it 14 to 16 fathoms.

The marks for this rock are the inner peak of Great Coque Lihou, in line with the Coupé rock, E. by S. $\frac{1}{4}$ S., and the conical beacon on the slope of the high land just within fort Tourgis, in line with the beacon in

Clonque fort, E. by N. These marks are used to clear the rock on either side as necessary. Tourgis beacon, in line with north end of Clonque fort, leads 2 cables to the northward of Pierre au Vraic. Cape La Hague light, open and shut of the south end of Alderney, leads close to the northward of it also.

Richards and Ellis Rocks are on a rocky bank lying rather more than half a mile to the south-east of the Pierre au Vraic, at the distance of one quarter of a mile from each other. Richards rock has $5\frac{1}{2}$ fathoms over it, and there is 23 fathoms within a cable to the southward; on the rock, the outer Coque Lihou appears a little open northwards of the inner Noire Pute, E. $\frac{3}{4}$ S., and the Great Nannel seen just within the outer eastern high rock on Burhou, N.E. by N. Ellis rock lies nearly 3 cables north from Richards rock. The Great Nannel on with the east end of Burhou, will lead a third of a mile to the eastward of these rocks. No large ship should pass between Richards rock and the Pierre au Vraic.

Tides.—The strength of the stream in the Swinge, that is, between Burhou island and the Corbet rock, sets straight through both ways at high and lower water; and, like the stream in the Casquet channel, begins to set to the south-westward at half-ebb exactly, and runs in that direction for 6 hours, or until half-flood; and the contrary with respect to the north-eastern stream. One branch of the flood, to the westward of the Narrows, sets through between Burhou island and the Ortac, particularly after high water on the shore; and, to the eastward of the Narrows, it veers and sets circuitously round the L'Emprone to the north-westward, and both uniting with the Casquets channel tides, and ultimately with that of the English Channel, again sets to the eastward. The last 2 hours of the south-western stream in the Swinge gradually veers towards the South, as it recedes from the draft of the former passage. The velocity of the north-eastern stream, during the springs, is $7\frac{1}{4}$ miles; that of the south-western stream $6\frac{1}{2}$ miles per hour.

ALDERNEY or AURIGNY ISLAND, is $3\frac{1}{2}$ miles long, east and west, and $1\frac{1}{2}$ miles wide where broadest, which is near the west end; the highest part is at the base of the windmill; it is here 295 feet above the mean tide level; at the telegraph, the island is about 9 feet lower. Alderney may be seen in clear weather at the distance of 22 miles; its eastern extremity bears W.N.W. nearly eight miles from Cape la Hague lighthouse, and E. by S. $\frac{7}{8}$ S. $8\frac{1}{2}$ miles from the Casquets. The appearance of the island from a distance is wild and gloomy, nor does its character improve on a nearer view. The southern and western coasts are high precipitous cliffs, intersected by narrow valleys, and fronted by outlying rocks, the most conspicuous among which are the Coque Lihou and Noire

Putes groups to the southward, and Les Etacs and Clonques to the westward ; the latter are now crowned with a battery which commands the Swinge channel.

The northern and eastern sides are much less elevated, and the coast there is formed by a series of bays of sand and gravel, separated from each other by steep projecting points, but with the exception of the small bays, of Braye now enclosed as a harbour of refuge, Plat Saline, and Corblets the intervals of beach are inaccessible, on account of the outlying rocks, which forbid all approach. The heights along the south and western coasts are covered with heath and furze, but the land within is generally cultivated and fertile. There are but very few trees on the island, and they are only to be met with in the valleys near the town, where the neighbouring hills afford some shelter from the wind.

St. Anne, the town of Alderney, is situate near the middle of the island ; it is large, well built, paved, and lighted with gas ; it has a large and handsome church (St. Anne's), besides which there are several chapels. In addition to the town of St. Anne, villages have sprung up at Craby, Braye new town, and at Mannez, owing to their vicinity to the public works and quarries.

The island abounds with springs of excellent water. Wood and fuel are imported from England, and cattle, for fresh meat, from Cherbourg ; these necessaries are nevertheless to be obtained almost at the same prices as at Guernsey, owing to the regular steam communication now existing between Alderney, Cherbourg, and Guernsey.

Until of late years Alderney possessed but two small insecure harbours, one called Longy bay, originally named Baie de Câtel, on the south-east side of the island ; and the other, the old artificial harbour of Braye on the north side ; both of which dry at low water neaps.

Alderney forms part of the Bailiwick of Guernsey, and is included in the military command of the Lieutenant-Governor of that island ; it forms one parish, under the patronage of the Crown, named St. Anne, the area of which is 1,962 imperial acres at high water of spring tides. The land was originally divided into small parcels amongst the inhabitants, but the Government have purchased about a third of it for their works.

The civil government or States consist of a Judge, appointed by the Crown, six jurats ; and twelve douzeniers, who are elected by the inhabitants. In 1871 the population of Alderney was about 2,738.

The ordinary garrison of the island consists of a battery royal artillery, besides the island militia, who are organized as artillery, and reported to be very efficient. The forts situated along the northern, eastern, and south-eastern shores of Alderney, now form quite a feature in the appearance of

the island on those sides; of them fort Albert is the most conspicuous, being situate on the crown of a remarkable conical hill, which rises from the comparatively low land at the north-east part of the island.

The APPROACHES to Alderney on every side but N.E. are difficult and dangerous from the numerous outlying rocks; and the dangers of the consequent intricate navigation are of course intensified by the great strength of the tidal stream; therefore, a stranger should not attempt to close with the island on any side but the N.E.; from which direction, however, a careful seaman may approach and enter the harbour of refuge by attending to the directions given hereafter at page 247.

ALDERNEY HARBOUR, on the north shore of Alderney, encloses the old harbour of Braye as well as the anchorage in the road fronting it, also the harbour of Craby; the latter built chiefly to shelter the vessels employed in laying the foundation for the West breakwater, and otherwise about the Government works. The rocks at one time encumbering the harbour of refuge have been removed, and the anchorage is now clear, but on account of the rocky nature of the bottom, vessels using their own anchors should in strong winds ride with a good scope of cable. The harbour is sheltered from all but easterly winds, which send in much sea.*

The West breakwater of this harbour, which was commenced in 1847 and completed in 1870, extended from Grosnez point straight for 1,000 yards N. 74 E., when it curved northwards for 173 yards in a radius of 500 yards, thence straight to the end, N. 54 E., for the distance of 436 yards. The breakwater is built on an artificial bank of rubble stone or pierres perdues; the main part is 40 feet wide and 6 feet above high water at ordinary spring tides.†

At the upper end of the breakwater there is a slipway for boats and small vessels, with steps at the end descending to low water spring tides; there is also a flight of landing steps on the breakwater pier (within), at the distance of 930 yards from the shore. The inner part of the breakwater pier is now clear along its entire length, and the rubble bank on which it is built so steep that large ships may securely lay alongside at the distance of 50 feet. Mooring chains and bollards have been provided,

* See Admiralty plan:—Alderney harbour, No. 2,845; scale $\frac{1}{18}$ inches.

† On the night of the 8th January 1879, during a violent gale from the eastward, the seaward end of the breakwater was washed away, being scarcely visible at half tide, and was breached for a distance of 400 feet from the extremity. (Notice to Mariners No. 11 of 1879).

In August 1880, from the action of heavy seas, the breakwater had been broken away 400 feet from the extreme end; the damaged portion was nearly awash, with jagged heads and broken pieces of masonry protruding at low water. (Notice to Mariners No. 151 of 1880).

and there are also iron ladders from low water to the quay level, at short intervals along its entire length.

The breakwater is now (November 1881) partially destroyed, 800 feet from the extreme end, from which position a portion 600 feet long uncovers 5 feet at low water spring tides; thence is an isolated portion about 120 feet long, which dries 7 feet, with a gap on each side about 120 feet wide; these gaps are subject to constant change. From the inner gap, the breakwater is undermined for some distance nearer to the shore.

Caution.—Care must be taken when abreast the gaps, with the westerly tide running, to guard against the suction or indraught. (See page 247).*

Moorings.—There is one set of moorings (1st class) laid down near the inner part of the curve in the breakwater.

Dangers inside the Breakwater have for the most part been removed by blasting; these the Têtes Champignons, lying N.W. by W., three-fourths of a cable from Roselle point, have been reduced to 16 feet. Another group of rocks, lying W. by S. 2 cables from Roselle point have now 12 feet over them; and at the position of the late half tide rock there is 22 feet at low water.

The Aiguillons rocks may at present be considered to be the eastern boundary of the harbour of refuge; they consist of a group of eight heads which dry at low tide, the easternmost rock, named the Great Aiguillon, lies N.N.E. $\frac{1}{2}$ E., $1\frac{1}{2}$ cables from Bibette head. A beacon is placed on the small Aiguillon, which rock is the outer or northernmost of the group and lies due West, nearly half a cable from the Great Aiguillon. The beacon consists of a round tower of masonry, 19 feet high, and 9 feet in diameter at the base and 6 feet at the top, its summit being elevated 10 feet above high-water spring tides; the beacon is painted *red* and *white* in horizontal rings, and may be seen under ordinary circumstances from at a distance of 2 miles.

A dangerous reef of sunken rocks with 10 to 6 feet over them, lies three-quarters of a cable from a beacon, between the bearings of N. by E. and N.E. by E.; they will be cleared on the west side by keeping the flagstaff in fort Albert open westward of the beacon bearing S. by W., and the beacon in line with the outer Grois rock E. by N. will lead clear of the 16 feet rock in the harbour off Bibette head.

LIGHTS.—Two *fired red* lights are exhibited at the head of the harbour of refuge to mark the fairway channel by night; the lower light is exhibited through a long tube which screens it in every direction excepting on a line through the middle of the fairway; this light is fixed on the parapet of the old pier at Braye and elevated 25 feet above high water at spring tides; it may be seen 5 miles in clear weather. The upper light is

* Commander C. V. Anson, H.M.S. *Dasher*, November 1881.

fixed on the site of the north-east corner of Braye reading room S.W. by W., 370 yards from the lower light; it is elevated 55 feet above high water, and may be seen in clear weather from a distance of 8 or 9 miles.

Braye Old Harbour is formed by only one sheltering pier, built out in an easterly direction from the west side of Braye bay; it dries at low water neaps, and was very insecure before the Admiralty breakwater was built; even now it is very inferior to the harbour of Craby.

The best time to enter Braye harbour is on a rising tide between half-flood and high water; at low water there is a depth of 8 feet between the iron beacons which are placed one on either side of the entrance on the two rocky clumps just without the pier head. The west beacon has a circular eye on its top, and the eastern one a cross. No leading mark is required, but the pier head should be rounded as close as possible.

Craby Harbour was constructed by the Government in 1850, in the creek formerly called little Craby bay, between the old harbour of Braye and Grosnez point. In addition to the shelter of the breakwater, this harbour is protected by two small piers having an entrance between the pier heads, 40 feet wide, open to the north-east. This enclosed harbour is 100 yards long from west to east, and 90 yards wide, and affords 230 yards of quay room on its northern, western, and southern sides, or space sufficient to berth four colliers of about 150 tons burthen. The harbour dries out to the pier heads at low water of ordinary springs, and 8 feet at ordinary neaps; at half-tide there is 9 feet between the pier heads. No special directions are necessary.

DANGERS N.W. and NORTH of ALDERNEY.—

Les Etacs, the most remarkable of all the rocks near the west end of the island, form the southern boundary of the Swinge channel. They consist of a group of four; the highest is elevated 128 feet above high water; the centre of the group lies off the W.N.W. point of Alderney at the distance of 2 cables from the shore.

Les Boues des Etacs lies W.N.W. $1\frac{3}{4}$ cables from the outer Etac; the north-western head has only one foot on it at low water. The east end of the outer Noire Pute in line with the west end of the Coupé leads half a cable to the westward of them, and the north or lower part of Tourgis fort in line with south part of Clonque fort leads the same distance to the northward of them.

The Clonques are three high rocks attached to the western shore of Alderney by a rocky ridge, uncovered at low water, on which there has been built an elevated roadway to communicate with the Clonque fort. The Clonque fort has been built on the summits of the two rocks nearest the land. A wooden beacon stands in the rear of the fort, on the south-eastern head of the Clonque.

Plat Boue, Founiais and Ozard Rock, lie off the Clonques on a line bearing about W. $\frac{1}{2}$ S. from the fort; the first close to the main reef; the Founiais, which dries 6 feet nearly 2 cables from the fort, and Ozard rock on which there is 4 feet at low water nearly 3 cables from it. Ozard rock is very small; on the top of it the great Noire Pute (the inner one) is seen just open eastward and clear of the inner rock of Les Etacs S. $\frac{1}{2}$ E., and Tourgis beacon is in line with north tangent of Clonque fort E. $\frac{1}{2}$ N. To clear the rocks use these marks as necessary.

Querouelles and Barsier Reefs are two dangerous rocky groups, situate northward of the Clonques. The middle of the former lies N.N.W. 2 cables from the fort, and the latter N. by W., 4 cables from it. The Querouelles dries 8 feet, the eastern heads of the Barsier 5 feet, and the western head is just awash at low water spring tides. The eastern head of the highest Barsier bears S.W. by W. $\frac{1}{2}$ W., 2 cables from Corbet rock; the western head of the reef lies on the same line of bearing three-quarters of a cable from its eastern head. The eastern head of outer Noir Pute in line with the west end of Alderney S. $\frac{1}{2}$ W., clears the west side of Barsier by half a cable, and fort Albert flagstaff in line with the inner part of Grosnez fort E. by S., leads clear of its north side about the same distance.

Caution.—There is no safe passage inside Querouelles and Barsier, even for boats, and the first of the flood sets right on them; at this time, therefore, a wide berth should be given them in passing.

Corbet Rock lies half a mile N. by E. $\frac{1}{2}$ E. of Clonque fort, and N.W. by W. $\frac{1}{2}$ W., half a mile from Tourgis point, and is never wholly covered, though at very high springs it is awash. There is a small detached rocks outside of Corbet that dries at low water; it lies 40 yards on the line of Corbet and Tourgis fort. Corbet is attached at low water to Alderney by a dangerous ledge of rocks, and the ebb as well as the flood stream runs over this ledge with great rapidity. A large fort is erected on Tourgis point.

The long western mark for the Corbet is the north-eastern tower on Casquets a little open to the southward of the Ortac, W. by N. $\frac{3}{4}$ N. westerly; and the southern extremity of the Casquets just shut in with the south end of the Ortac will lead to the northward of the Corbet end through the narrows of the Swinge. Between the Corbet and east end of Burhou the streams rush with great velocity, and during a weather tide the sea breaks nearly across the Swinge; the smooth water then is mostly found near the Corbet.

The Grosse, a large prominent rock 14 feet above high-water springs, is steep-to and may be approached within half a cable. It lies E. $\frac{3}{4}$ S. 4 cables from the Corbet, and North 2 cables from Tourgis point.

The Jumelles are two small ridges of rock, which uncover at half-tide, lying about E. $\frac{1}{2}$ S. 8 cables from the Corbet, and 3 cables to the northward of Platte Saline bay. The end of the breakwater kept on a bearing of E. $\frac{1}{2}$ S. will lead to the northward of all dangers on the south side of the Swinge, from the Barsier and Corbet upwards.

Braye Rocks are a group of four heads, the outermost of which seldom covers, though awash at high-water springs; the three others, named the Follets, show at half-tide. The outer Braye lies N.E. $\frac{3}{4}$ E., $2\frac{3}{4}$ cables from the tower of the new fort on Grosnez point, and a cable from the breakwater. A rock, with only $3\frac{1}{2}$ feet on it lies E.N.E. a third of a cable from the outer Braye.

DANGERS N.E. of ALDERNEY.—The dangers most to be feared on the north-eastern side of Alderney are the sunken rocks N.E. of the Aiguillons, the Grois, the Platte, the Ledge, and the Sauquet. The sunken rocks N.E. of Aiguillon are described at page 239.

Grois Ledge is an extensive dangerous reef, lying off L'Etoc point; it extends $2\frac{1}{2}$ cables between the bearings of N. by E. and N.E. from the tower of the fort on that point, which should not be approached on these bearings within half a mile. The peaked rock, named the outer Grois, the highest of the reef, is awash at high water ordinary springs, and bears N. by E., distant $1\frac{3}{4}$ cables from the tower of the fort. Several of the heads show at half tide, and many more at low water. The stream rushes over this reef with great velocity. The depth is $13\frac{1}{2}$ feet at a cable W.N.W. of the outer Grois. Ortac and Noire Houmet in line and open of the end of the breakwater W. $\frac{3}{4}$ N. leads half a cable outside the ledge.

Platte Rock lies S.S.E. $2\frac{3}{4}$ cables from the outer Grois, and uncovers 4 feet at low-water springs. From the rock, the Ortac is just open north of L'Etoc point, W. by N., and the high rock, named Bon Ami, on the east side of Corblets harbour in line with old Corblets barracks, S.W. The ground between the Platte and the outer extremity of the Grois reef is foul, and should not be approached by any vessel.

The Ledge, or Fosse de la Band, is a reef of considerable extent, with 13 feet water. It lies E. by S. two-thirds of a mile from the outer Grois rock, with the latter rock in line with the Ortac W. by N., and the high conical shore rock named Honoré, at the west end of the Mannez quarries, in line with the small round tower of the new barracks on Essex hill, S.W. $\frac{3}{4}$ W.

The long western mark to clear the dangers on the north-east shore of Alderney is, the Casquet towers open northward of Burhou island W. by N. $\frac{1}{4}$ N.

Sauquet Rock lies 2 cables to the southward of the Ledge, and $1\frac{1}{2}$ cables to the north-east of Homeaux Florains reef, on which a small fort has been constructed. The Sauquet uncovers 3 feet at low-water springs, and the western mark for it is, the tower of L'Etoc fort in line with the Ortac, W. by N. $\frac{1}{4}$ N. Great [Nannel in line with Grois rock. W.N.W. just clears it outside. The ebb stream running down for the Race of Alderney and for the Swinge, separates or forks off at the Sauquet, and its tendency is to throw vessels that are near this rock right on it. A berth should therefore be given it of 3 or 4 cables. The outer Grois and north-east point of Burhou island in line leads between the Ledge and the Sauquet.

DANGERS on EAST SIDE of ALDERNEY. — The principal dangers lying off the eastern side of the island are the rocky patches named the Brinchetaie, the Boufresses, and the Blanchard, with the rocky patches to the south-eastward of port Longy.

The Brinchetaie are a dangerous group of semi-detached rocks forming a ledge off the eastern point of Alderney. The outer rock lies 3 cables from the shore and uncovers 11 feet; the inner rock uncovers 16 feet. Raz island flagstaff in line with south extreme of Essex castle or the high Noire Pute, inner Coque Lihou and south side of L'Etoc de la Quoire, in line bearing W. $\frac{3}{4}$ S., leads southward of the Brinchetaie; and the outer part of Quenard fort in line with the inner part of Florains fort leads to the eastward. Several shoals, awash at low-water equinoctial springs, extend to the south-east of these dangers, as far out as one-third of a mile from the coast.

Boufresses Reef lies nearly 4 cables westward of the Brinchetaie, its outer end being a quarter of a mile to the eastward of the new fort on Raz island or Houmet de Longy. The reef uncovers to a considerable extent at low water. Raz island flagstaff in line with middle of Essex castle leads to the southward.

Blanchard Bank is composed of rock, gravel, granite stones, and shells. At its western extremity, which lies 6 cables from the eastern end of Alderney, there is a mass of rock with only $2\frac{3}{4}$ fathoms water; thence the bank extends E. by S. $\frac{1}{2}$ S. for 3 cables, where there is another rock with only 12 feet on it (Blanchard rock) which lies three-quarters of a mile from Houmet Herbe on the outer or eastern edge of the bank; between its western end and the dangers off the east end of the island there are 9 to 12 fathoms water. The Blanchard is very dangerous, and particularly its eastern extremity, which rises precipitously from soundings of 20 and 25 fathoms, causing, during springs, eddies and a heavy sea on a weather tide.

Directions.—To clear the Brinchetaie, Boufresses, and Blanchard, lying off the eastern end of Alderney, the Coque Lihou rocks should be opened out their own apparent breadth to the southward of L'Etac de la Quoire, bearing W. $\frac{1}{4}$ N., but no more, as three unconnected rocky patches lie to the south-eastward of Longy, stretching off as it were from the tails of the Brinchetaie and Blanchard at the several distances of half a mile, three-quarters of a mile, and $1\frac{1}{2}$ miles from the latter. Upon the two outermost of them there are only 17 and 18 feet water, and $4\frac{1}{2}$ fathoms upon the patch nearest the Blanchard. From the outermost rock, named the Raz or Race, the telegraph tower is three times its own length open southward of the L'Etac de la Quoire, and Doyle column, Guernsey, is nearly in line with the Grande Amfroque. From the centre patch St. Anne mill appears twice its own length open to the southward of the Rousset; and from the northern patch St. Anne mill is in line with the southern angle of Essex fort. Doyle column just open to the northward of the northernmost bluff land on Herm W. by S. $\frac{3}{4}$ S., leads well to the southward of them all; and for the same purpose, do not bring the lighthouse on cape de la Hague more southerly than E. $\frac{1}{3}$ S., or keep the Casquet towers in sight to the southward of Alderney.

SOUTH COAST OF ALDERNEY.—Longy Bay or Baie du Câtel, lies on the south-east side of Alderney, and dries at low water neaps; it affords but little shelter, excepting to small coasting vessels capable of taking the ground; and since the construction of Alderney harbour is but seldom used. The entrance to the bay lies between Raz island, formerly called Houmet du Câtel, on which there is a fort, and the Queslingue rock. The distance between these points is less than 2 cables, and this small space is divided into two channels of equal width by a rock in the centre, which dries 2 feet at low water springs; moreover both the ebb and flood tide set violently across the entrance of the bay. It will therefore be apparent that a stranger should never attempt to enter it except in a case of absolute necessity. In the event of such occurring, attention is called to the following:

Directions.—The best time to enter Longy bay is with the wind between N.W. and S.W., and between 2 and 5 hours ebb; a vessel may then run aground, and on the succeeding tide she may be hauled up under Essex nunnery, on the sandy beach at the western side of the bay. The leading mark in with the above winds is the Nunnery just shut in to the westward of Queslingue rock, N. by E., easterly, and by borrowing within half a cable of the latter rocky point, the fairway sunken rock at the entrance will be avoided.

Anchorage.—Longy road affords good shelter from northerly and north-westerly winds in from 10 to 14 fathoms water, sand, gravel, and

shells. Anchor with the whole of fort Albert just shut in with, and seen over the west point of Longy bay, N. by W. $\frac{1}{2}$ W. and the Grande Folie rocky peak, just open eastward of Raz island fort, N.E. $\frac{1}{2}$ N. This berth is in 9 fathoms, $1\frac{1}{2}$ cables from the shore. A better berth than this and more out of the tide may be had off the middle of La Tchue bay, just to the westward of Rousset rock; anchor here, at a distance of $1\frac{1}{2}$ cables to the westward of Rousset rock, on the line of the west side of Raz fort touching east side of Queslingue rock.

La Roque Pendante is a remarkable overhanging rock, on the apex of the bluff, within Rousset rock, and to the S.W. of fort Essex; it may be seen from a distance of 9 or 10 miles on an easterly or westerly bearing, but on altering the bearing on either side it soon shuts in with the island, and is then invisible unless from a very short distance.

Queslingue and Rousset rocks are high and peaked, and lie within 2 cables east and west of each other.

L'Etac de la Quoire lies about the middle of the south coast of the island, at the distance of half a cable from the shore, with which it is connected at low water. It is a conical rock, about 60 yards in diameter, and 10 feet lower than the Great Coque Lihou.

Bonit Rock lies nearly half a mile to the southward of the Etac de la Quoire. This dangerous rock is of small extent, and appears only at low-water springs, and has from 10 to 14 fathoms close to. The marks for it are the Grande Folie to the eastward of Longy, between the Rousset and the Queslingue rocks; and L'Etac de la Quoire rock in one with a beacon on the adjoining shore, bearing N. by E. $\frac{3}{4}$ E. The Bonit may be avoided by not approaching Alderney nearer than a mile, or by keeping the Casquets in sight to the southward of the island.

Alderney South Bank extends from Bonit rock to the southward and S.W. to the distance of more than $1\frac{1}{2}$ miles; the general depth on the main bank is 15 fathoms, gravel, from which as a base there rises 7 small banks of sand, some of them having as little as 6 fathoms on them. These small banks lie in an E.N.E. and W.S.W. direction, and have sharp ridgy apexes. The largest bank is less than a quarter of a mile long. The shallow spots commence at a distance of rather more than half a mile S.W. $\frac{1}{2}$ S. from Bonit. A vessel may pass inside of them to the eastward, by keeping Coupé rock open southward of outer Coque Lihou, until Grand Folie comes open eastward of Queslingue rock; and outside by keeping Verte-tête open westward of outer Noire Pute N. by W. $\frac{1}{2}$ W., until Grande Folie appears in line with Raz island fort, N.E. $\frac{1}{4}$ N.

By night the Casquet light N.W. $\frac{3}{4}$ N. will lead one mile to the southwest of Alderney bank, and half a mile on the same side of the Pierre an

Vraic. Cape la Hague light kept on any bearing northward of E. $\frac{1}{4}$ S. will lead to the southward of Alderney south bank.

Some of the heaviest overfalls in the Race are caused by these banks, they must therefore be avoided in bad weather.

Coque Lihou Rocks lie nearly a mile to the westward of L'Etac de la Quoire, and about a quarter of a mile from the shore. They consist of a group of three, Great Coque Lihou, the middle or eastern one being much larger and higher than either of the others, is 116 feet above high water, and lies S.S.E. $\frac{1}{4}$ E., rather more than half a mile from Alderney telegraph tower. A bank of sand extending from Great Coque Lihou to the eastward, a quarter of a mile, has on it as little as $1\frac{1}{2}$ fathoms. It makes a convenient anchorage for fishing boats and small craft in fine weather.

There is a 5-fathom channel inside the Coque Lihous, close to the Alderney shore, but it is only a cable wide, and therefore not to be attempted by a stranger. Rocks awash at low water extend from the Coque Lihous more than half way across to Alderney, and a continuous sunken chain unite them to the Joyeaux rocks, a scattered group lying about half a mile to the westward.

The Noires Putes are a group of rocks, four in number; three of which are always uncovered; the two outer rocks are much larger and higher than the other; these lie east and west, rather more than a cable apart; the westernmost of these rocks is flat-topped, and elevated 55 feet above high water. The eastern one has a peak elevated 76 feet; this is sometimes named the Great Noire Pute, it lies S.W. by S., nearly three-quarters of a mile from Alderney telegraph tower. The group is quite steep-to outside.

Aiguillon, Coupé, and Orbouée, three rocks elevated respectively 20, 24, and 8 feet above high water, lie between Noires Putes and Les Etacs, in a W.S.W. direction, half a mile from the south-west extreme of Alderney, and forming the southern boundary of the anchorage called Fossé Malières, or west bay. The Coupé, the middle of the three, is sometimes called the Cocked hat, which it somewhat resembles in appearance; it is one of the marks for the Pierre au Vraic. Orbouée rock, the outer of the group, is awash at high springs; it is connected with the Coupé under water; is steep to the southward and to the west, but there is a rock with only 2 fathoms water, lying a cable from it N.W. by N.

ORBOUÉE BANK extending S. by W. rather more than half a mile from Orbouée rock, consists of a bank of gravel, sand, and broken shells; the general depths on it are 8 and 9 fathoms, but near its outer end there is as little as $3\frac{1}{4}$ fathoms; this part rises in a narrow ridge of fine sand from the main bank, and is very difficult to pick up; it is thrown up,

apparently, by the turning of the stream. On the shoalest spot the great Nannel is seen a little open westward of outer of Les Etacs, and L'Etac de la Quoire in line with the north part of outer Noire Pute. The bank will be cleared by keeping the Pierres de Bût open westward of Les Etacs N.N.E., until L'Etac de la Quoire comes open to the eastward of Noires Putes, E. by N.

Anchorage.—The best anchorage at the west end of Alderney is at the Fossée Malières, or West bay; anchor here in 10 fathoms gravel, with the Great Nannel touching the outer end of Western Etac, N. by E. $\frac{1}{2}$ E. and Great Coque Lihou seen clear inside Aiguillons S.E. by E. $\frac{1}{2}$ E. Here a vessel will lie out of the tide. There is anchorage also outside of Orbouée rock in 7 fathoms on a S.S.W., bearing from it at the distance of a quarter of a mile, but it is exposed to the full force of the flood stream, and therefore not safe.

Directions for Alderney, and the Harbour of Refuge.

—From the north-eastward, in hazy weather, it will be prudent to obtain a bearing of cape de la Hague, when a vessel may stand boldly for the north-east end of the island; but should the weather be so thick that it cannot be discerned at the distance of 2 miles, neither the cape nor the island should be approached within that distance; to avoid the outlying rocks.

When nearing the cape or the island the tides must be carefully considered: and it may be useful to note that on] nearing the east end of Alderney, the Great Coque Lihou rock open eastward of the island will keep a vessel in the stream of the Race, and the Casquet light open north of Burhou island will keep her in the Swinge or Channel stream.

In clear weather a vessel may stand direct for the island. The leading mark into the anchorage within the breakwater is the tower of St. Anne church in line with the pier head of the old harbour of Braye, S.W. $\frac{1}{2}$ W.; and in fine weather it can be seen 5 or 6 miles off.

Caution.*—From the strength of the west-going tide, especially at springs, which sets directly on to the submerged end of the breakwater for about 9 hours out of 12—it is recommended on entering the harbour, so as to pass well clear of the dangerous portion (*see* page 239), to keep the beacon on King's battery well open of the beacon on Homet des Pies, or Fort Albert flagstaff in line with the stone beacon on the small Aiguillon rock, until St. Anne church spire comes in line with the Old pier head, when this mark leading into the harbour should be kept on.

When the tide is running to the eastward, the shoal end of the breakwater may be safely passed by keeping on the line of the beacons erected for passing clear of this danger (the beacon on King's battery in line with the beacon on Homet des Pies).

* Commander C. V. Anson, H.M.S. *Dasher*, 1880.

the Race, Swinge, and Ortac channels, is turned in an easterly direction by the force of the channel stream; also on the ebb tide, the channel stream running in a westerly direction, past cape La Hague, Alderney, and the Casquets, is forced through the channels between these places in a southerly direction; but this description of the stream only applies to the periods of high and low water; in its transition from one to the other, peculiarities occur requiring a particular description.

The flood or north-eastern stream begins to make through the Race and Swinge channels when the tide has risen 3 hours by the shore, and it attains its great strength, 7 to 8 knots, about high water. An hour after high water by the shore, the stream in its revolving course is setting about N.E. by E. and begins to abate in strength; still veering in direction and slacking in strength, it sets faintly to the N.W. at 3 hours after high water, causing a short slack in the Swinge, and also on the north-west side of Burhou; after which the ebb tide comes down and rushes through these channels with a velocity nearly as great as the flood. After low water the tide begins to veer to the southward and abates in strength; an hour and a half after low water the stream is setting from the northward on Alderney and Burhou, causing extensive slacks or eddies to the southward of these islands, and at half flood the offing stream, now very weak, sets to the S.E., causing a dead slack for a short period in all the channels between Alderney and the Casquets.

Having thus described the general course of the main tidal stream round Alderney, it is necessary to describe some of the most important eddies caused by the peculiar turning of the tide and the obstructions of the islands and rocks.

Alderney, the Casquets, and intermediate rocks, all narrow in proportion to their length, and each lying on a line of direction nearly east and west, are in the line of tide when the stream is at its strength, on both ebb and flood; therefore at these times the resistance they offer to the free course of the stream is small and the eddies under them insignificant; but as the stream in its rotary course moves out of this line of direction, extensive eddies are formed under the lee of Alderney, alternately on its northern and southern shores; these eddies are called the inshore streams.

On the northern shore of the island the inshore stream commences at Sauquet rock and extends to the westward as far as Corbet rock, and within it to the southward of the vortex of the Swinge, running 9 hours to the westward and only 3 to the eastward; the former commencing an hour before high water and the latter at 2 hours flood. Along the southern side of the island, between Orbouée rock and Raz island, there are 9 hours of eastern and but 3 hours of western stream; the former stream commences one hour before low water and runs along the land



toward Longy during the whole flood and until 2 hours ebb again. In the neighbourhood of Longy, meeting with the south-western stream from the Race, it suddenly veers and unites with it; the latter stream commences at 2 hours and ebb sets towards the Orbouée for 3 hours or until 5 hours ebb, at which time it joins the south-western stream from the Swinge.

These two great eddies or in-shore streams are exactly the reverse of each other; their general courses and action will be easily understood by reference to a chart of Alderney and a careful perusal of the above remarks; but as the northern eddy sets across the entrance of Braye harbour of refuge at times with great velocity and then constitutes the principal danger there, a particular description of its action will follow.

The direction of the flood stream, half an hour before high water about which time it attains its greatest strength, is about East; this being the line of direction of Alderney it runs full on the west point of the island by which the stream is now fairly divided, one part rushing through the Race along the south side of the island with a velocity of between 7 and 8 knots, the other through the Swinge at about the same rate, leaving a small eddy previously noticed, under the east end of the island, near the Sauquet rock.

At high water by the shore the turning of the offing stream from an easterly to a northerly direction relieves the pressure of the Swinge stream from the end of the breakwater; and at this time during a spring tide the Swinge stream is running to the eastward with a velocity of 3 knots at the distance of 120 yards from the end of the breakwater; the intermediate space being filled up by the stream setting round the breakwater to the westward at the rate of 3 knots. This latter is the inshore eddy or ebb stream: it commences in the eddy near Sauquet rock and begins to set to the westward, as stated above, an hour before high water; at this period the western stream sets round the end of the breakwater in volume a mere thread, but it gradually increases in magnitude as the turning of the offing stream removes the pressure of the Swinge stream from the end of the breakwater.

The most dangerous period of this tide and eddy is about high water, at which time they set past each other, separated only a few feet, with the velocity stated above; great caution must therefore be used should it be necessary for a long screw vessel to enter the harbour during this period. The great length of the breakwater obstructing the course of the western stream being the cause of the danger, the current is of course strongest near the outer end of that structure, and therefore at such times it will be advisable to enter the harbour a little to the southward of the mid-channel

course rather than risk a near approach to the end of the breakwater. An hour after high water the inner edge of the east-going Swinge stream is removed to the distance of 2 cables from the breakwater end, and both streams beginning to abate in strength, the danger gradually ceases.

At 2 hours ebb the Swinge stream, now slacking fast and veering to the westward, sets on the Nannels, the western stream running past the end of the breakwater at the rate of 3 knots, meeting the eastern stream in the Swinge a little outside Corbet rock; uniting with it and both setting towards the Nannels; within Corbet rock the western stream sets down to the west end of the island.

At half ebb by the shore the offing tide is setting faintly to the N.W., and there is slack water in the Swinge, but only for a few minutes, after which the westerly Swinge stream makes there, and immediately commences to run past the breakwater end with renewed strength until low water by the shore; gradually slacking as the offing stream veers from W. $\frac{1}{2}$ S. to the southward. Whilst the tide is veering through the latter section of its course there is slack water at the entrance of Braye harbour; after an interval of which, the stream sets across the end of the breakwater in an E.S.E. direction, 2 hours after low water.

The RACE of ALDERNEY is the name applied to the strait between that island and cape La Hague. Here, as in the Swinge and Ortac channels, the streams sets to the south-westward at half ebb by the shore, and runs in that direction, with the variations given as under for six hours, or until half-flood, and the contrary with respect to the north-eastern stream; for there is but little slack water there.

The greatest strength of the south-western stream (about $2\frac{1}{2}$ hours) begins 5 hours after high water at Alderney, and ends $4\frac{1}{2}$ hours before the following high water. The greatest strength of the north-eastern stream continues about 2 hours; that is, from one hour before high water at Alderney, until one hour after. During equinoctial springs, the velocity of the south-western stream or ebb is nearly 7 knots, and of the north-eastern stream nearly 8 knots, neaps $5\frac{1}{2}$ knots. The first $2\frac{3}{4}$ hours of the south-western stream in the Race, that is, from half-ebb till low water, sets W.S.W.; and the last two hours, that is from low water till half-flood sets S.W.; and the contrary for the first and last $3\frac{1}{4}$ hours of the north-eastern stream, which between half-flood and high water, sets very strongly round cape La Hague. There is therefore $5\frac{1}{2}$ hours south-western, and $6\frac{1}{4}$ hours north-eastern stream, that is half an hour's difference between the Race tide and that in the Ortac and Swinge channels.

In boisterous weather, if the wind and stream are ever so obliquely opposed, the sea breaks in all parts of the Race, as if it were over small

knolls or patches, which makes it difficult and often dangerous for small vessels to pass through ; at such times there are heavy overfalls over all the sunken rocks and bank, which must of course be carefully avoided.

DANGERS in the RACE.—Both the outer and inner Race rock have been repeatedly examined and well sounded over without finding less water than 18 feet, reduced to low-water spring tides, and this is believed to be the true depth over each of them at that period ; and there is then 12 feet on the Blanchard rock. There is a rocky bank lying W. $\frac{1}{2}$ N. $3\frac{1}{4}$ miles from cape La Hague light, which, although probably not dangerous, throws up a strong overfall, and should be avoided. The fairway of the Race lies between this bank and the Race rock ; the distance between these points is $3\frac{1}{4}$ miles ; the soundings in this, the narrowest part of the Race, are regular, between 22 and 24 fathoms, but the bottom entirely rocky throughout.

Middle Rock, an isolated head with 7 fathoms water, lies S.S.E. $4\frac{1}{2}$ miles from Alderney telegraph tower ; from it the Casquets bear N.W. $9\frac{3}{4}$ miles, and cape La Hague E. $\frac{3}{4}$ N. $8\frac{1}{2}$ miles. When the tide is running strong, the position of this rock is marked by a breaker or overfall, and there is at all times a ripple over it ; it may be avoided by day or night by attending to the directions given at page 248 for passing through the Race.

CAUTION.—When running through the Race of Alderney, it is at all times best to take the fairway of the channel described above ; bearing in mind that the north-eastern stream between half-flood and high-water on the shore, sets very strongly round cape La Hague, off which there project several sunken rocks.

The direct course from the Race to the Little Russel channel is W. by S. $\frac{1}{2}$ S., and from the Casquets to that channel nearly S.W. $\frac{1}{2}$ S. If bound therefore from the Race or Casquets to the Little Russel, between the periods of low water and half-flood, and of high water and half-ebb, allowance must be made for the stream, which obliquely crosses the courses during these periods, and great care must be taken to avoid the Middle rock and the Banc de Schôle.

Bearings and Distances.

Casquets to Grunes de l'Ouest	- S.W. by W.	16 $\frac{1}{2}$ miles.
„ Hanois Lighthouse	- S.W. by W.	21 $\frac{1}{2}$ „
„ Roustel Rock	- S.W. $\frac{3}{4}$ S.	14 $\frac{3}{4}$ „
„ Blanchard Rock	- S. by W. (southerly)	18 „
Pierre au Vraic to Roustel Rock	- S.W. $\frac{1}{2}$ W.	14 $\frac{3}{4}$ „
Race Rock to Platte Boue	- S.W. by W. $\frac{3}{4}$ W.	15 $\frac{5}{8}$ „
„ Roustel Rock	- W.S.W. (southerly)	19 „

Race Rock to Blanchard Rock	- S.W. $\frac{1}{2}$ S.	18 $\frac{1}{4}$ miles
„ E. side Paternosters-	S.S.W.	25 „
„ Belle Hougue Point-	S. by W. $\frac{1}{4}$ W.	27 $\frac{1}{8}$ „

BANC DE SCHOLE, lies nearly in the direct line between the Great Russel channel and the Race of Alderney; like most other banks between the Channel islands, it consists of a mixture of fine gravel, sand, and shell; it is very steep to the southward and westward, but shoals gradually on the N.E. side.¹

Taking the 5-fathom line as the first contour of the bank, it is 1 $\frac{1}{2}$ miles long, N. by E. and S. by W., and one quarter of a mile wide near the middle, tapering off to a mere ridge at the extremes. The 10-fathom contour of the bank includes a space 2 $\frac{3}{4}$ miles long N.N.E. and S.S.W., and three-fourths of a mile wide, whilst the 20-fathom contour will include a length of 5 miles by 1 $\frac{1}{2}$ miles. The top of the bank is very narrow and consists of small semi-circular ridges of sand, convex to the S.W., the general depth over which is 3 fathoms of the lowest spring tides; near the middle of the bank, however, as little as two fathoms was found, having some spots near with 2 $\frac{1}{2}$ fathoms.

The soundings taken on this bank at different periods tend to prove that its apex is continually varying in altitude, and it is probable, therefore, that it also shifts its position, within a particular and limited space, according to tide, weather, &c. The position of the shoalest spot on the bank did not alter perceptibly, however, from 1861 to 1869; the marks for it are Alderney telegraph tower N. by E. $\frac{3}{4}$ E. easterly, 7 $\frac{3}{4}$ miles, Casquet light N. by W. $\frac{1}{4}$ W. 10 $\frac{1}{2}$ miles, and Serk Windmill S.W. $\frac{2}{3}$ W. 10 miles.

Directions.—Between low water and half-flood it will be advisable to pass to the eastward of the Banc de Schole, but between half-ebb and low water to the westward, because in both these cases the tide will favour the attempt. Doyle column, Guernsey, in line with the Fauconnière rock, W. by S., or the Etac de Serk open to the eastward of the Burons, or the lighthouse at cape de la Hage, N.E. by E. $\frac{3}{4}$ E. leads to the south-eastward and southward of the bank. Doyle column just open to the northward of the northernmost bluff land on Herm, W. by S. $\frac{3}{4}$ S., or the Gouilot pass kept open to the westward of the Bec du Nez, Serk, or the lighthouse at cape de la Hague, E. $\frac{3}{4}$ N., leads to the north-westward and northward; St. Martin point, appearing midway between the Fauconnière and the south-western end of Herm island, points to its shoalest part; and the whole of Burhou shut in behind the Etacs and Noires Putes, N. $\frac{1}{2}$ W., will lead along the east side of the bank at the distance of more than a mile. In bad weather, if the wind and tide are



ever so obliquely opposed to each other, the sea breaks very dangerously on all parts of the bank.

OYSTER-GROUND.—About 11 miles in a north-easterly direction from La Coupé point, the north-eastern extreme of Jersey, and nearly 14 miles in a south-eastern direction from the middle of Serk, lies an extensive oyster ground, the marks for which are, as follows, viz., the island of Jethou in one with Bec du Nez, Serk ; Rozel mill in line with the Burons de Drouilles, and the two high heads of the Pierres de Lecq in one with point Grosnez. There is, however, little or no difference to be observed with respect to the various depths of water in its neighbourhood.

CHAPTER VII.

THE ISLAND OF JERSEY, WITH ITS APPROACHES AND ADJACENT
DANGERS.

 VARIATION IN 1882, $18^{\circ} 40'$ West.

JERSEY.—The form of this island is that of a parallelogram, its greatest length E.S.E. and W.N.W. being $9\frac{1}{4}$ miles, and its breadth $5\frac{1}{4}$ miles. The middle of the island, in an E.S.E. and W.N.W. direction presents an uniform level surface, elevated about 280 feet above mean tide; its northern shore being from 100 to 150 feet higher. By a singular contrast with the island of Guernsey, the declivity of which lies towards the north-west, Jersey declines towards the south-east; and to this circumstance may probably be attributed the pre-eminence which the latter enjoys in the richness of its productions, the luxuriant appearance of its surface, and the peculiar mildness of its climate. Granite and syenitic rocks are the principal formations.*

The interior of the island is well wooded, fertile, and intersected by deep beautiful valleys, running from south to north, through which numerous streams find their way to the low land on the south coast; several occasionally uniting before discharging themselves into the sea.

Jersey possesses several good bays or roadsteads besides its artificial harbours. The best among the former are Gorey roads, at Grouville bay, on the east side of the island, and St. Aubin bay on its south coast; in either of which a good and well found ship may ride out the heaviest gales from any quarter in safety. The principal artificial harbour is at the seaport of St. Helier, which is the chief town of the island, and is situated at the east side of St. Aubin bay. There are also harbours of inferior magnitude at St. Aubin, on the north side of the bay, at Gorey and Rozel, but they all dry at low-water spring tides.

Jersey has its own legislature, the States, consisting of the Lieut.-Governor and the Bailiff of the Royal Court, appointed by the Crown; twelve Jurats (Judges) of the Royal Court, elected for life by the rate-

* See Admiralty chart, Jersey island, 3 sheets, Nos. 62 *a*, *b*, and *c*; scale $m=4\cdot0$ inches.

Note.—The soundings given in this Chapter have been reduced to a zero corresponding to a range of 37 feet tide; and the lowest tide registered in Jersey between 1864 and 1869 fell 22 inches below that level.

payers; the Rectors of the twelve Parishes into which the island is divided, and the Constables of the same; also a Deputy for each parish (St. Helier having three Deputies), elected in the same manner for three years. Appeals lie to the Queen in Council.

This island, like Guernsey and Alderney, is in the diocese of Winchester. Each parish has its own church, the spires of which serve as the principal landmarks.

The old Norman French is spoken by the natives, but the English language is rapidly coming into use.

The population of the island, according to the census of 1871, amounted to 56,627.

A considerable portion of the island is laid out in orchards; cider and apples being among its chief exports. Early potatoes are also raised in great quantity for the London market. The chief imports are grain, flour, cattle, and timber for ship-building; the latter principally from Sweden, Norway, and North America; the former from France.

Ship-building was formerly carried on with great success and some very fine and fast vessels have been built here of 500 to 1,200 tons burthen, but the trade is now in a state of decay, 1870.

In 1870 there were 446 vessels belonging to the island, and one steam tug, measuring 48,812 tons in the aggregate, and employing 4,014 seamen; sixty of these vessels manned by about 600 seamen, are employed in, or connected with the Newfoundland cod fishery.

St. Helier, the chief, and, correctly speaking, only town of the island, is built on low land open to the south, but overlooked and sheltered on the north by a semicircular elevated plateau completely commanding it. The town is well built, and so extensive that in it are located about half the population of the entire island, nearly 30,000 souls. It has a college and several churches; the spires of which latter, together with the noble fortress of fort Regent on the east side of the town, are the most remarkable objects from the sea.

Supplies.—St. Helier has a well supplied market, where fresh meat and poultry may be purchased at about the same prices as in London. Fish are scarce, vegetables and fruit abundantly cheap.

PILOTS.—The following is extracted from the Law on Pilotage issued by the States of the island of Jersey in January 1857:—

“The master of every vessel bound to this island, and arrived one mile West of the Corbière rock, shall lay his vessel to, as soon as a pilot is in sight, and take a pilot on board as soon as one presents himself, on pain of paying such pilot the highest rate of pilotage.

“Fishing boats and vessels admeasuring forty tons and less shall not be liable to take a pilot, but all other vessels employed in the coasting trade

shall be liable so to do, paying half the pilotage dues, when it has been ascertained, that they are employed in the coasting trade only, unless it be otherwise provided by the tariff.

“When the weather is so stormy as to prevent a pilot from boarding a vessel, at sea, the master of such vessel and the pilot shall so steer that the pilot boat may take the lead and serve as a guide, and such vessel shall be liable to the same pilotage dues as if the pilot had boarded her.

“Any pilot passing a vessel coming to the island shall be liable to a penalty of five pounds sterling, unless such vessel have already a pilot on board, or the weather is so stormy as to prevent the pilot from boarding her.

“Every pilot shall have a flag striped horizontally red and white, 6 feet long and 4 wide, which on boarding a vessel and taking charge, he shall direct the master thereof to hoist at the peak as a signal that a pilot is on board, under the penalty of five pounds sterling against the master refusing to do so.

“Any pilot undertaking to pilot a vessel shall, when required so to do, exhibit to the master or mate of such vessel his warrant, together with this law and tariff annexed thereto, under the penalty of thirty shillings.”

APPROACH TO JERSEY FROM THE NORTHWARD, WITH OUTLYING ROCKS AND DANGERS.

Like Guernsey and Alderney, Jersey is completely encompassed with dangers of every description, which are rendered doubly formidable by the great rise and fall, as well as rapidity of the tides. The most remarkable are, the Pierres de Lecq, or Pater-Nosters, the Drouilles, and the Ecréhos, on the northern and north-eastern sides; the Violet bank surrounding the south-eastern angle; and the Minquiers ledge, with many other rocks, to the southward.

BANC DESORMES, lies $3\frac{1}{2}$ miles to the northward of Grosnez point, and a like distance from the highest of the Pierres de Lecq rocks. It is a bank of rocky ground, a mile long N.N.W. and S.S.E., and a third of a mile broad; the depths on which are generally 12 to 15 fathoms, excepting near its extremes, where two large conical masses rise from the bottom; the northern one to within 23 feet of the surface, and the southern to $7\frac{1}{2}$ fathoms at low water. The latter bears from the former S.S.E., distant three-quarters of a mile.

On the 23-feet rock, which is small and pointed, with depths of 9 to 12 fathoms close around, La Moye signal post is only just shut in behind the outer part of Pinnacle S. $\frac{1}{2}$ W.; and the south-western high rock of

the *Pierres de Lecq* appears shut in with *Belle Hougue* point nearly as far as the outer part of its high bluff S.E. $\frac{1}{2}$ S.

Clearing marks.—*La Moye* signal post in line with *La Rocco* tower bearing S. $\frac{1}{2}$ E. leads westward ; *Tour de Rozel* just shut in with *Belle Hougue* point S.E. leads southward ; and *La Corbière* rock just in sight outside the *Pinnacle*, S. by W. $\frac{1}{2}$ W. leads eastward of *Banc Desormes*.

PIERRES DE LECQ, is a rocky group, the western end of which lies N.E. by N., nearly $2\frac{1}{2}$ miles from *Grosnez* point, the north-west extreme of *Jersey*, and nearly abreast *Grève de Lecq* bay ; from which the middle or highest rock bears N.N.E. distant $2\frac{1}{2}$ miles. There are four large rocks, elevated from 20 to 30 feet above high water, lying near the middle of the S.E. side of the reef ; from the highest of these the reef dries to the N.W. for nearly a mile at low water : and within it to the S.E., for about the same distance there are banks of sunken rocks, the outermost of which have only 20 feet over them at low water. The most dangerous rock inside the main group is called *Grane de Lecq*, which dries 2 feet at low water, and lies S. by E. $\frac{1}{2}$ E., nearly half a mile from the aforesaid great central rock of the group.

Directions.—The *Pierres de Lecq* may be cleared on their west side by keeping the *Corbière* rock in line with *Pinnacle* point S. by W. $\frac{1}{2}$ W. A nearer mark may be had with *St. Peters* mill in line with *Grève de Lecq* flagstaff S. by E. $\frac{1}{2}$ E. To pass inside of them, keep the *Tour de Rozel* shut in behind *Belle Hougue* point S.E., until the white tower in *Grève de Lecq*, a white sandy bay, comes in line with the eastern point of the bay S.W. $\frac{1}{2}$ W., with which mark run to the north-eastward until *Rozel* mill appears over *Belle Hougue* point S.S.E. $\frac{1}{2}$ E., which leads to the north-eastward.

When the marks are not visible, or at night, pass through the middle of the channel between *Jersey* and the *Pierres de Lecq*, *Drouilles*, *Ecréhos*, &c.

DROUILLES CHANNEL, between the dangerous rocky group of that name and the *Pierres de Lecq*, is about 5 miles wide ; is safe for vessels of any size, and free of any outlying danger ; having regular soundings in 13 fathoms throughout.

For a description of *Drouilles* and *Ecréhos* rocks, see pages 307 and 310.

Appearance of Jersey from the Westward.—Vessels approaching *Jersey* from the westward will make the land about *St. Ouen* bay ; of which the high precipitous bluff of *Grosnez*, situate at its north extreme, will appear to be the most remarkable. Special attention is called to this particular feature of *Jersey*, as in making the coast of *Guernsey* from the westward the bluff land at *Pleimont* would there appear as the south extreme of land, the northern part declining gradually to the sea

level. To the southward of Grosnez the high land runs nearly level. On the edge of the plateau overlooking St. Ouen bay stands St. Ouen mill, and a church with steeple a little beyond it. Still farther in the background will be seen St. Peter's church, with its lofty spire; and occasionally, glimpses will be had of the other churches and mills of the island still more distant.

An extensive range of buildings known as St. Peter's barracks, is the most conspicuous object on the heights near the south part of St. Ouen bay, the signal post of La Moye appearing to the southward of it, near the extreme of the land in that direction. Between these latter objects there is an extensive district covered with sand, called the Quenvais, part of which forms a very remarkable feature in the appearance of this part of the coast. On the extreme south of St. Ouen bay, the huge rock called the Corbière with its lighthouse will be seen, if not shut in with the high land of La Moye point; and to the northward of it, along the sandy shore of St. Ouen bay, will appear La Rocco fort and tower, and four other towers, besides the one at L'Etac point, near the north extreme of the bay. Between L'Etac and Grosnez points there is a very remarkable rock named Pinnacle.

ST. OUEN BAY, the appearance of which from the sea is described above, forms the western coast of Jersey between Grosnez point and the Corbière. It affords good shelter in easterly winds, but the greater part of the bay being rocky and foul, the anchorage is thereby limited to a space of ground about half a mile square, near the south part of the bay off La Rocco tower. This part is, however, very easy of access, and may be safely used by large vessels without pilots. Of course no vessel should anchor in St. Ouen bay during westerly winds.

An extensive reef, dry at lower water, stretches off to the westward of La Rocco tower for about half a mile, and then extends along the shore to the southward in the direction of the Corbière, which it unites with Corbière point. The whole of this reef is covered before high water, except a small rocky clump near the middle of it. Between La Rocco tower and L'Etac there is a fine beach of white sand, but at low water it is fringed with rocks throughout. Off L'Etac point to the westward this reef dries out to the distance of three-quarters of a mile from the shore at low water; the greater part covers before half flood, and no part of it is visible at high water.

Rigdon Bank lies at the outer edge of the sunken part of the L'Etac reef, nearly 2 miles to the westward of L'Etac point. It consists of ridges of rocks, the interstices of which are filled up with sand and gravel. It lies about E.N.E. and W.S.W., a mile long and a quarter of a mile wide. The general depth on the bank is 3 to 5 fathoms, but there are two rocks with

open and shut of the inside part of Corbière rock, S.E. $\frac{1}{4}$ S., leads to the westward; and Jument rock in line with the high water rock, situate about midway between Corbière point and Corbière rock, S.S.E., clear its inner extreme. St. Ouen mill a little open northward of Square fort, bearing E. by N. $\frac{3}{4}$ N., leads through the middle of the passage between the north and south ridges.

Anchorage.—The only good anchorage in St. Ouen bay, where a vessel may be sheltered from the tide, is in 7 fathoms sand, between the Great bank and La Rocco tower, with St. Ouen mill a little open northward of the small square fort on the beach, between Nos. 2 and 3 towers, bearing E. by N. $\frac{3}{4}$ N., and Corbière rock S.S.W.

La Frouquie Pass lies between La Frouquie and La Boue rocks. The former stands at the outer edge of the reef extending from La Rocco tower to the Corbière rock, bearing North half a mile from the latter. La Boue is situate near the inner part of the sunken reef within Les Boiteaux, N.W. $\frac{3}{4}$ N. a third of a mile from Corbière rock; it is elevated a foot above half tide. La Frouquie covers 6 feet at high-water springs. The clearing marks given above for the outer and inner parts of the Great bank are the best to enter this pass to the northward, for should La Boue and La Frouquie both be covered, a vessel cannot go too near the former so long as Jument rock is in sight inside the Corbière rock, nor can La Frouquie be touched without opening Jument rock to the eastward of the high rock between Corbière point and La Corbière rock. There is a small rock off La Frouquie with only a foot on it at low-water springs, which lies on the line of Jument rock and a beacon pole on the west side of the high rock between Corbière point and Corbière rock. With this exception there is a clear passage of more than a cable wide, having $2\frac{1}{2}$ fathoms at low water.

From this description it will be seen that no vessel ought to attempt to run through when the tide is low; at half tide and above, that is when La Boue rock is nearly awash, it is quite safe for vessels under 15 feet draught.

At or about this period, therefore, enter the pass, about midway between La Frouquie and La Boue, with Jument rock midway between the Corbière rock and the large rock situate midway between it and Corbière point; and when St. Ouen church-spire comes on with the high rocky clump outside, or to the south-westward of La Rocco tower, bearing N.E. by E., steer for the Corbière rock; which must be approached to the distance of three-quarters of a cable; circling round the Corbière rock at this distance from it, and running out to the southward when Pinnacle rock comes nearly in line with the outer part of the Corbière.

Corbière Point, at the south-west end of Jersey, is a small low hill with a flag-staff on the summit, and two small houses at its side. Just within the point the land rises at a steep slope, and soon unites with the high table land of La Moya.

CORBIÈRE ROCK, standing one quarter of a mile westward the point, and connected with it by a reef of rocks which dry after low quarter ebb, is 70 feet above high water, and is very remarkable. It stands prominently out from the coast line of the island, and forms the principal landmark for vessels approaching from the westward; it may be seen in clear weather at the distance of 10 or 12 miles.

LIGHT.—A lighthouse is built on the Corbière rock, and exhibits an elevation of 119 feet above high water springs a *fixed* white light when seen from seaward between the bearings of S. by E. through East, to N. by W. Inshore of the eastern limits of the white light, two sectors of red light are shown, one to the north-eastward for marking the shoal ground of the Riglon bank and thence to the land; the other to the south-eastward for marking Les Vrachères, and the adjacent dangers between it and the shore. The light is dioptric of the second order, and in clear weather the white light should be seen from a distance of 17 miles.

Fog signal.—During fogs a bell is sounded *three* times in quick succession at intervals of *thirty seconds*.

Caution.—Mariners must be very careful when navigating within the limits of the red light.

The principal dangers off the Corbière are the **Green Rock**, **Les Boiteaux**, and **Noirmontaise**.

Green Rock, the outermost danger, has 11 feet on it at low water. It lies N.W. by W. $\frac{1}{4}$ W. nearly three-quarters of a mile from the Corbière, and 2 cables from the Boiteaux, on the same line of bearing. The marks for it are St. Ouen mill just within or to the eastward of No. 3 martello tower in St. Ouen bay, counting from the northward, bearing N.E. by E. $\frac{1}{4}$ E., and the whitewashed rock within the Corbière called **Jument**, in line with La Moya Point, S.E. $\frac{3}{4}$ E.

Another rock with only 8 feet on it lies E.N.E. one cable from the Green rock. Both rocks will be cleared on the north-west side by keeping St. Ouen windmill open northward of the aforesaid martello tower; and on the south side by keeping La Moya signal-post open southward of Jument rock. La Moya signal-post in a line with Jument rock leads 3 cables south of the Green rock, and half a cable clear on the same side of the Noirmontaise reef.

Les Boiteaux are two rocks only 60 yards apart, lying within the Green rock; they dry 9 feet at low water and bear about N.W. by

W. $\frac{1}{2}$ W. nearly half a mile from the Corbière. From the southern Boiteaux, St. Ouen church is seen open south of the 4th martello tower N.E. by E. $\frac{1}{4}$ E., and La Moye signal-post is in line with the north side of the peak of the Corbière rock S.E. by E. $\frac{1}{4}$ E.

Noirmontaise Reef dries 4 feet at low water, and lies one quarter of a mile to the westward of the Corbière.

There is another reef lying one cable westward of the Corbière, having 4 feet over its shoalest part at low water; also a large rock bearing S. by E., distant one cable from the Corbière, and which uncovers after first quarter ebb.

There is a narrow deep water channel between the Green rock and Les Boiteaux: also the narrow channel within the Noirmontaise and La Boue rocks, close to the Corbière leading to La Frouquie pass; but the space included between Les Boiteaux and La Boue, and from the latter rock to within one cable of the Corbière, is so thickly studded with sunken rocks, as to be very dangerous, even for boats at low water, and should be avoided.

Jument Rock, remarkable from having a large white patch painted on it, lies about a third of a mile within the Corbière to the south-eastward, and an eighth of a mile from the high bluff next to the eastward of Corbière point, with which bluff it is connected by a reef dry at low water. There is a dangerous rock which dries only at last quarter ebb, half a cable outside the Jument; it should not be approached therefore nearer than a quarter of a mile.

LA MOYE POINT, a high cliffy bluff, a mile to the eastward of the Corbière, is safe of approach from the westward, at a reasonable distance from the shore; but $1\frac{1}{4}$ cables off it, there is a sunken rock, having only 6 feet over it, and close to the eastward of this rock and probably connected with it, lie the dangerous rocky group called the Kaines, the highest of which only covers at last quarter flood. The outer sunken rock of the Kaines lies 2 cables from the shore.

All these dangers will be cleared by keeping the Corbière open a little to the westward of Jument, until Tabor chapel, a remarkable white building standing on the high land near the middle of and overlooking St. Brelade bay, opens out a little to the eastward of Grosse Tête.

ST. BRELADE BAY, near the south-west end of the island, between La Moye and Le Fret points, is much contracted by an extensive reef that fringes its eastern shore, and the anchorage in it is further cut up by the Fournier and Fourché rocks. It is therefore very inferior to St. Aubin bay, and more exposed to the sea in southerly gales; neverthe-

less, small vessels and even large open boats anchored off port Bouilly, have been known to ride out fresh gales in safety from this, the most exposed quarter.

Under all circumstances of wind and weather there is much less sea on the western than on the eastern side of the bay, and it seems to be quite certain that if a breakwater were to be built out from Grosse Tête to the Fournier rock, the anchorage off Beau port and Bouilly would be safe at all times.

On approaching St. Brelade bay from the westward the most remarkable objects seen are Grosse Tête, the high square rock under the high cliffy land of La Moye on the west side of the bay; and Noirmont tower standing prominently out at the end of the low point of that name to the eastward. On opening out the eastern side of the bay clear of Grosse Tête, the white sandy beach appears, and the two martello towers built to defend it; beyond are villa residences and scattered groups of houses; whilst overtopping all, on the high land near the middle of the bay stands Tabor chapel, a plain white building with slate roof, forming the principal landmark in it.

Near the middle of the bay are the Fournier and Fourché rocks, lying about W.N.W. and E.S.E. of each other, distant one quarter of a mile. The best anchorage is round the Fournier, distant from it rather more than a cable; the ground is quite clean up to the base of this rock, which is of very small extent. The Fournier dries 9 feet and the Fourché 10 feet at low water. The other but less important rocks of the bay are the Fournier du Hâvre, which dries 17 feet, at nearly a third of a mile within the Fournier, the Platte Houmet, drying 12 feet in the bight of the bay near the shore, and the Rousse rock, 60 feet high, on the east side of the bay.

Banc de St. Brelade is a reef of sunken rocks commencing half a mile South of La Moye point, and extending eastward for nearly three-quarters of a mile; the least water found, 29 feet, is near the middle of the bank.

Banc Le Fret, lying immediately off the point of that name, distant from it rather less than a quarter of a mile, is rather more than one quarter of a mile in length N.W. and S.E., and of an oval form. There are several rocks on its eastern side with 22 and 24 feet on them, and one on the west side with only 14 feet; the marks for the latter are Nicolle and Noirmont towers in line E. by S. $\frac{1}{4}$ S., and the western martello tower in St. Brelade bay in line with the Rousse Frouquie N.N.E. $\frac{1}{4}$ E.

At 2 cables eastward of Banc Le Fret, in the direction of Noirmont tower, there is another rocky bank on which the least water is 20 feet. Both this bank and Le Fret, as well as Banc de St. Brelade, may be

cleared on their north-east side, by bringing the Corbière nearly on with La Moye point; and the two first-named will be cleared on their south side by opening the peak of Corbière rock a little to the southward of Jument.

Directions. — Vessels from the north-westward bound to St. Brelade or St. Aubin bay, on nearing the shore of Jersey should keep Plémont point open of Grosnez point E. $\frac{3}{4}$ S., until the Corbière rock bears S. by E. or St. Ouen church and mill are in line S.E. $\frac{3}{4}$ E., to clear the Rigdon shoal. With these marks they will be abreast the shoal, and thence should steer so as to round the Corbière at the distance of about a mile; or keep St. Ouen windmill open northward of No. 3 martello tower in St. Ouen bay E.N.E., until La Moye signal-post is seen over the top of the Corbière, to avoid the Green rock. When La Moye signal-post opens southward of Jument rock (white) bearing E. by S. $\frac{1}{2}$ S., or the outer part of the high table-land within Noirmont point is seen a little open of Le Fret point, a vessel will be clear of the Noirmontaise reef and all other dangers south-westward of the Corbière, and may run for La Moye point until La Motte islet is just shut in behind Noirmont point, and Noirmont tower bears S.E. by E. $\frac{1}{2}$ E., which is the leading mark for the fairway between the Kaines, off La Moye point, and Banc de St. Brelade. When Tabor chapel comes in line with, or a little open of, Battery point N.E. $\frac{3}{4}$ E., take it as a leading mark through the western pass into the inner anchorage off St. Brelade. If desirous of approaching the inner anchorage through the eastern pass, open Tabor chapel a little to the eastward of a small dark-coloured house on the beach in St. Brelade bay N.E. $\frac{1}{2}$ N., and run in on that line.

Anchor within the Fournier rock, on the above given leading lines and between them, when La Moye bluff comes nearly in line with, or a little open of the outer part of Grosse Tête, about W. by N. $\frac{1}{2}$ N., in 5 fathoms, fine sand. Large vessels not wishing to anchor within the Fournier, may lie in $8\frac{1}{2}$ fathoms gravel with the western pass leading mark on, and the Jument rock just shut in with La Moye point. The ground in this bay is remarkable for holding.

PORTELET BAY, between Le Fret and Noirmont points, is small, and further contracted by rocks extending to the westward of the latter point as well as from the centre of the bay westward of Janvrin tower, which, together with the rapidity of the tidal stream across the entrance of the bay, render it dangerous of approach to vessels even of the smallest size.

The dangers are further increased by Portelet ledge, an isolated mass of rock lying S.W. by S., one quarter of a mile from Janvrin tower. The shoalest spot on this ledge is in 2 feet at low water; from which La Moye

equal part is well over a thousand square paces each, semi-detached from La Foix point S.W. and Normant tower is within the high part of *Rocher Pommé*, 2 miles from the other. Normant tower is line with the high part of *Rocher Pommé*, or a little open outside it, just inside clear south-west of *Paradise ledge*.

In case of necessity compelling a vessel to anchor in *Paradise bay*, the best position is in 4½ fathoms, north with La Moine point just clear with La Foix point, and *Jaumain tower* N.E. $\frac{1}{2}$ E. Anchor inside *Paradise ledge* (only in the above case, a little to the eastward of it, in 5 fathoms; with *Cartiers rock* nearly in line with La Moine point S.W. $\frac{1}{2}$ W., *Jaumain tower* S. by E. $\frac{1}{2}$ E., and *Elizabeth castle* just open southward of *Normant tower*, East.

ST. AUBIN BAY.—The whole of the anchorage in this fine bay, though surrounded on every side by rocks, is free from any ground capable of damaging a vessel's cable, and is sheltered from all winds but those from S.S.E. round westerly to W.N.W., and partially given from them. South-westerly gales send in a heavy rolling sea between half flood and high water, but in proportion as the water falls the sea subsides, the rocks in the offing greatly contributing to break its force and effect.

St. Helier, the principal town on the island, is on the north-eastern side of the bay, and the little town of *St. Aubin* with its castle, which gives its name to the bay, is on the western side, opposite *St. Helier*; their distance from each other being about 2½ miles. Both these towns have *stone pier* harbours, wherein vessels lie aground at low water, upon a soft muddy sand; the tide, at low-water springs, receding half a mile from *St. Aubin* harbour, and half a cable outside the entrance of the new harbour of *St. Helier*. There is also a strong mole or breakwater projecting from the northern side of *St. Aubin* castle, sheltering a pier within, where vessels frequently refit and unload, grounding, however, at low water.

Elizabeth castle is built on a craggy rock on the eastern side of the bay fronting the harbours of *St. Helier*, and about three-quarters of a mile to the north-westward of the town; the top of its high central tower or keep, on which the colours are displayed, being 144 feet above the low-water level of the sea. On the site of this castle was once an *Augustine monastery*, built in honour of *St. Helier*, a recluse, whose hermitage, built on the summit of a high rock, situate nearly a third of a mile to the southward of the castle, is still extant.

Elizabeth and *St. Aubin* castles are insulated every tide, and from their prominent positions afford shelter respectively to the two harbours, by breaking the swell which rolls into *St. Aubin* bay during south-westerly gales.

ST. HELIER HARBOURS* are on the north-east side of St. Aubin bay. The old harbour has been completely enclosed by a new one, constructed from the designs of Mr. J. Walker, C.E., between the years 1840-50, at a cost of 170,000*l*. Both harbours are alike in form, the new one being in fact a mere repetition of the old, on an extended scale; excepting that from the inferior plan of the entrance to the new harbour, the south-westerly swell ranges freely into it in heavy gales, to the great injury of vessels compelled to remain there at such times. These harbours are nearly rectangular, narrow in proportion to their length, and have their entrances near their south-western corners.

The inner or old harbour is about 1,900 feet long by 300 feet broad, having a depth of 8 feet at its entrance at half tide, and 5 feet within it. The outer harbour is 2,600 feet long by 500 feet broad; it has 16 feet at its entrance at half tide, the ground rising gradually within the pier heads for a distance of about 300 feet, where there are 13 feet at that period; the bottom is fine sand and mud throughout.

There is a floating dock capable of accommodating vessels of 500 tons; there is also a steam tug always in attendance on the shipping.

A Life Boat is stationed at St. Helier.

ST. AUBIN HARBOUR.—Several rocks lie scattered to the southward and westward of St. Aubin castle, but most of them appear at low water. The two largest and most conspicuous rocks are the Grosse and the Platte, which lie very close together, about one quarter of a mile from the castle, the former being the most elevated and showing about first quarter ebb. Both rocks are marked with beacon poles. There is also a group of rocks lying one quarter of a mile to the southward of the Grosse, the north easternmost of which dries 7 feet at low water. La Haule house open eastward of St. Aubin castle breakwater leads eastward of these rocks; to the eastward of this line the ground is all fine sand. At half flood there is 8 feet water inside St. Aubin castle pier, at which period the water begins to flow into the entrance of St. Aubin inner harbour. The passage inside St. Aubin castle is not passable for boats until half flood.

Water of first rate quality may be procured at the inner quay of St. Helier old harbour, from pumps placed there for the purpose; it may be procured also in the same way at St. Aubin harbour.

LIGHTS.—The following *fixed* lights are exhibited all night for the guidance of vessels bound into St. Helier harbour.

A *white* light, from the lighthouse on the Victoria, or new south pier-head, 31 feet above high water, and visible about 6 miles.

* The new harbour works, commenced in 1872 to enclose the two present harbours have been suspended since 1878.

A *red* gas light on the Albert or North pier, just within the head, 15 feet high, visible at night.

A *green* gas light on the western angle of Albert pier, and a *red* light within the opposite parapet wall, bearing from each other N.E. $\frac{1}{4}$ N., and S.W. $\frac{1}{4}$ S.; distant 600 yards and visible 2 or 3 miles.

These two lights in line lead through the middle of the small road, between the Outer and Inner Nest rocks, and between the Cloches rocks, clear of all dangers. The lights in line may be used also when they can be seen in fact, and between the Hinguette rock and Grune St. Michel; and in the case of fog, when a little ebb way or other in time to clear a rock lying only 7 feet out of the low-water lying in the fairway, $2\frac{1}{2}$ cables out of the fairway, and toward of the high head of the Hinguette.

In addition to the above, there is a *red* gas light in the upper pier road; elevated 60 feet above high water, and bears from Victoria pier light E.N.E., distant 680 yards.

DANGERS off ST. AUBIN BAY.—The principal dangers to be avoided in approaching St. Aubin bay, in addition to the St. Brelade and the Nest rocks, here noted on page 266, are the Vrachère; the Hubaut, with its surrounding rocks; the Grunes; the Grunes Vaudin; the Sillette rocks; the Point; the Grunes aux Pards, and Danger rock on the western side; the Round rock near the middle; and the Grunes St. Michel; the Hinguette, Les Filaires, and Pointe de Pas on the eastern side. The Diamond rock lies nearly on a line representing the chord of the bay, near the middle; the Pigeon, Les Grunes du Port, and Les Junée lie along its western shore; the Balance and other sunken rocks to the eastward, off Elizabeth's castle; and Les Cloches off the entrance to the little road of St. Helier.

Some of the passages between these rocks are extremely narrow, and all are dangerous from the rapidity of the tides, and from the general discoloured state of the sea preventing the rocks being seen when close to them. Strangers should therefore never attempt to navigate these channels without a competent pilot.

Les Vrachères is a rocky bank of small extent forming the outer or south-western danger off St. Aubin bay. Its highest head, named Frouquie, with only 5 feet water, lies at the eastern extreme of the bank, with Princes tower touching the western corner of fort Regent E. by N., and the western tower in St. Brelade bay in line with the western head of Rousse Frouquie, N.N.E. $\frac{1}{2}$ E.

Hubaut, Grande and Petite Grune, are all grouped together between Les Vrachères and point Le Fret. The narrow channels separating these rocky banks should never be attempted by vessels. From the

Hubaut, which dries 2 feet at low water, the western tower of St. Brelade bay is in line with the west side of Rousse rock N.N.E. easterly, and the east end of Almorah terrace is touching the inside part of Noirmont tower E. by N. $\frac{1}{4}$ N.

From the Grand Grune which dries 6 feet at low water Princes tower is in line with Elizabeth castle hospital, a small red-tiled building standing between the highest part of the castle and its north-eastern angle bearing E. $\frac{3}{4}$ N., and the western tower in St. Brelade bay is a little open of the high-water extreme of Le Fret point N. by E. $\frac{1}{4}$ E.

The Petite Grune has 10 feet on its shoalest part, from which St. Mark church spire is just shut in with Noirmont point E. $\frac{3}{4}$ N., and the western tower in St. Brelade bay is midway between Rousse rock and Le Fret point N. by E. $\frac{1}{4}$ E.

When approaching the western passage from the south-west, keep Seymour tower open outside La Frouquie rock until the Corbière bears North, or the eastern tower in St. Brelade bay comes open of la Cotte point. The Dogs Nest rock in line with the white patch on the sea wall at Grève d'Azette, heretofore used as the leading mark for the western channel, leads very close inside all these dangers, and their eastern boundary is marked by Tabor chapel seen in line with the high-water extreme of Le Fret point.

Les Grunes Vaudin are an extensive cluster of rocks lying off Noirmont point and a mile to the eastward of the Vrachères. The two highest rocks dry 5 feet at low water, near the middle of the bank, about N.E. $\frac{1}{2}$ E. and S.W. $\frac{1}{2}$ W. of each other, and nearly 2 cables apart. The north-eastern rock is known as the Grande Vaudin, and the other the S.W. rock; from the latter the gateway of St. Brelade church is just in sight eastward of Rousse rock N. $\frac{1}{2}$ W., and St. Mark church spire is a little open eastward of the south-east part of Elizabeth castle N.E. by E. $\frac{3}{4}$ E. From the S.W. rock a chain of dangerous sunken rocks extend in a W.N.W. direction for one quarter of a mile, and also to the north-eastward for half a mile; the eastern part of the latter is semi-detached from the Vaudin bank, and sometimes called Les-Poches-à-saie; there is as little as 4 feet on it at low water.

La Sillette lies immediately within the Grunes Vaudin, separated from them by a 7-fathom channel, a quarter of a mile broad. La Sillette is a small reef, less than 2 cables in diameter, but the rocks generally are higher than any others in the neighbourhood; its highest head, which lies close to the eastern side of the reef, dries 12 feet at low water, and is marked by a swinging beacon (pole) 23 feet high; from which the spire of St. Mark church is seen touching the south-east angle of Elizabeth castle

N.E. by E. $\frac{1}{2}$ E., and Icho tower is in line with the north side of La Frouquie rock E.S.E.

Grand and Petit Four.—The Grand Four uncovers 3 feet at low water. From it the New mill at Millbrook is in line with the rocks of Noirmont point N.E. $\frac{1}{2}$ N., and Nicolle tower is its apparent breadth open southward of the white patch on the Dogs Nest rock, which is surmounted by a small iron beacon, bearing E. $\frac{1}{2}$ S. The inner head of the Grand Four lies about N. by W., distant a cable from the highest rock just described, and has 6 feet over it at low water.

The Petit Four consists of a bank of sunken rocks extending a quarter of a mile east and west, lying to the eastward of the Grand Four, and distant from it only $1\frac{1}{2}$ cables. The highest rock is near the middle of the bank to the south-westward, and dries only one foot at low water. There is another rock close to the south-east side of this one-foot rock, that dries only 6 inches at low water; and a third lying E. by N., distant $1\frac{1}{2}$ cables from it, that is just awash at that period; the latter is close to the east side of the reef; and from it fort Regent flagstaff is seen on the north side of False Hermitage rock bearing E. by N., and Mont Plaisir house is touching Point de Bût N. by E. $\frac{1}{2}$ E.

Grunes aux Dards is a rocky bank about a cable in diameter, lying about one quarter of a mile to the eastward of the Sillette. From its highest head, which lies near the north part of the bank and dries 5 feet at low water, St. Mark church is seen midway between the Hermitage and the Close rocks N.E. by E. $\frac{1}{2}$ E., and Janvrin tower is in line with the south-western high-water extreme of Ile Percée N.N.W.

There is another rock close to this, on a N.N.E. bearing, which dries 4 feet; and a third which dries 3 feet, half a cable S.S.W. from it. A rock awash at low water bearing S.S.E., distant a cable, marks the limit of the bank in that direction; and to the eastward of the highest rock, and $1\frac{1}{2}$ cables from it, lies the Frouquie, a sunken rock entirely detached, on which there are 5 feet at low water.

Danger rock with 5 feet over it at low water, lies on the east side of a sunken reef lying to the southward of the Grunes Aux Dards, and from it the east end of Almorah terrace appears just touching the north side of the Hermitage N.E. $\frac{1}{2}$ E., and Janvrin tower is just open of the south-west high-water extreme of Ile Percée N.N.W.

Rouaudiere Rock which dries 4 feet at low water, is small and steep-to, except on its S.E. side, whence a ridge of sunken reef extends half a cable off. From the rock, La Haule house is seen just open on the west side of St. Aubin castle N. $\frac{3}{4}$ W., St. Saviour church is in line the north-west side of False Hermitage, N.E. by E. $\frac{3}{4}$ E., and Icho tower is touching the



south side of Tas de Pois, or White rock, S.E. by E. $\frac{1}{4}$ E. A red buoy with staff and black ball is moored in 5 fathoms water, 50 yards westward of this rock.

Grunes St. Michel consists of two small banks of sunken rocks lying nearly north and south of each other, little more than half a cable apart; the longest diameter of the southern group is about a cable, in an east and west direction, having the least water, 3 feet to the westward. The highest head of the northern group dries 5 feet at low water, and from it La Moye signal-post is seen over and about half way down the slope of Le Fret point N.W. $\frac{1}{4}$ W. and St. Mark church spire is in line with the northern white patch on Albert pier N.E. $\frac{1}{4}$ E.

Hinguette Reef, lying one quarter of a mile south-eastward of the Grunes St. Michel, is a quarter of a mile long N.E. by N. and S.W. by S., and most of the rocks on it dry at low-water springs; the highest lying near the north-west end, dries 11 feet, and another, lying three-quarters of a cable within the south-west end, 5 feet at low water.

The highest rock, which dries 11 feet, lies with the west end of Victoria college in line with Dogs-nest rock N.E. $\frac{3}{4}$ E., and La Moye signal-post just open south-westward of Noirmont tower N.W. $\frac{1}{4}$ W. From this rock the reef extends to the eastward rather more than half a cable, and 2 cables to the S.S.W.

Les Têtards has only 2 feet over its outer head at low water; from which Seymour tower is seen touching the inside part of La Frouquie E. by S., and the west end of Almorah terrace is a little open eastward of Dogs Nest rock N.N.E. $\frac{3}{4}$ E.

Nine-Foot Rock lies nearly midway between Les Têtards and Tas de Pois, and from it Icho tower appears the apparent breadth of La Frouquie open inside of it S.E. by E. $\frac{3}{4}$ E.; fort Regent signal-post is in line with the east side of Crabièrè rock N.N.E. $\frac{1}{4}$ E.; and No. 2 tower in St. Aubin bay is seen just within or on the east side of Gros du Château rock N. $\frac{1}{4}$ W.

DANGERS in St. AUBYN BAY.—The Rouaudière rock, described above, lies right in the fairway off the middle of St. Aubyn bay, S. by W., nearly half a mile from the Diamond rock. The main channel to the little road of St. Helier from the westward is between the Rouaudière and Grunes St. Michel; it is half a mile wide at this part, and has an even bottom, with a depth of 6 fathoms at low water.

Diamond Rock lies near the middle of St. Aubin bay, and has 8 feet over it at low water. From it fort Regent flagstaff is seen touching the north side of Close rock E. $\frac{3}{4}$ N., and La Haule house appears midway between St. Aubin castle tower and the end of the breakwater extending from it, N. by W. $\frac{1}{4}$ W.

Pignonet, Grunes du Port, and Les Junée are the most important dangers off the western shore of St. Aubin bay.

The Pignonet uncovers 10 feet at low water on the line of Le Fret and Noirmont points, distant from the latter a quarter of a mile. It is marked by a pole and ball, from which La Haule house is seen touching St. Aubin harbour pier head N. by E., and St. Saviour church is just open north-west of the spire of St. Mark church E. by N. $\frac{1}{4}$ N.

There are many rocks between the Pignonet and Noirmont point; the most dangerous one which is outside the line between these two places, is the same height at Pignonet, and lies with the outer apex of Le Fret bluff in line with Noirmont tower, $1\frac{1}{4}$ cables from the latter.

Les Grunes du Port is a rocky group nearly a cable long, north and south. The southern rock has 3 feet over it at low water, and the northern head dries 6 feet at that period; on this latter rock Upper Blanc Pignon house is just touching the end of the high wall extending from the north-west side of St. Aubin castle N. $\frac{1}{4}$ E., and fort Regent flagstaff is in line with Elizabeth castle flagstaff, East.

Les Junée are a sunken rocky group lying 2 cables N.N.E. from Les Grunes du port. From the southern rock, which is covered 2 feet at low water, the lower Blanc Pignon is just shut in with the semi-detached buccion eastward of St. Aubin castle N. $\frac{1}{4}$ E., and fort Regent signal-post is seen over and shut in with the north-eastern extreme of Elizabeth castle E. $\frac{1}{4}$ S.

Helme Rock, the most important danger within the bay on its eastern side, lies between Gros du Château and the Diamond rock, with only 2 feet over it at low water. From it the lighthouse on Victoria pier is seen just touching the north side of Close rock E. by S., and the east end of Almouah terrace is on the north side of the high rock next to the north-eastward of Gros du Château N.E. by E. $\frac{3}{4}$ E.

Outer Rock, off Hermitage reef, has 7 feet on it at low water, and lies with the outer extreme of La Motte in line with Oyster rock beacon N.E. by E., and the east end of Victoria terrace nearly touching the north extreme of Elizabeth castle N.E. by E. $\frac{1}{4}$ E.

Les Cloches are two sunken rocks immediately off the entrance to the little road of St. Helier. The western rock has 8 feet water, and lies with Nicolle tower a little open southward of Dogs Nest rock beacon E. $\frac{1}{4}$ S., and the Oyster rock beacon in line with north-eastern extreme of Elizabeth castle N.N.E. $\frac{1}{4}$ E. The eastern rock of Les Cloches, with only 2 feet water, lies E.S.E. $1\frac{1}{4}$ cables from the western rock; another rock with 8 feet over it lies N.N.W., $1\frac{1}{2}$ cables; and a third with 7 feet over it lies N.E. by N., $1\frac{1}{4}$ cables. This last rock lies with Elizabeth castle flagstaff in line with the Oyster rock beacon, distant from the latter

exactly one cable. A chain of sunken rocks connects this last rock with the Oyster rock group, but close outside it or to the southward, there are 3 fathoms with clean ground.

Oyster Rocks and Grune Moulet occupy positions one on either side of the entrance to the Little road of St. Helier. They lie S.E. $\frac{1}{4}$ E. and N.W. $\frac{1}{4}$ W. of each other, one quarter of a mile apart, and are each marked with a swinging beacon, consisting of a pole bearing a ball. The marks for the Oyster rock are, the new windmill on the beach at Milbrook in line with the eastern apex of Gros du Château bearing North, and the north-western angle of St. Saviour touching the south-east angle of St. Helier church.

The Oyster rocks uncover 13 feet at low water. The beacon pole is marked in 23 divisions of a foot each. When the rocks are awash there are 10 feet water between Victoria and Albert piers; and by deducting the number of divisions seen above water from 33 it will give the depth between the piers.

The Grune Moulet dries 11 feet at low water. Its beacon is marked in 10 divisions of 2 feet each.

Platte Rock lies within the entrance to the Little road of St. Helier E. $\frac{3}{4}$ N., exactly a cable from Oyster rock beacon. It dries one foot at low water, and from it the S.E. rock off the Hermitage is seen just open clear of the east side of Elizabeth castle. There is no safe channel between Oyster rock and the Platte.

Sharp Rock dries 3 feet at low water, S.E. by E. $\frac{1}{2}$ E., $1\frac{1}{2}$ cables from the Platte. The channel into the Little road lies between Platte and Sharp rocks, and in it there are 22 feet water at the lowest equinoctial spring tides. In passing between these rocks, constituting the narrowest part of the channel, the Platte will be cleared on its east side by keeping the spire of St. Mark church a little open on the east side of the northern white patch on Albert pier; and Sharp rock will be cleared on its western side by bringing the east end of Almorah terrace a little open on the west side of Albert pier.

Anchorage.—There is sufficient room for several vessels to lie at single anchor in St. Aubin bay, but in mooring the hawse should be open to the south-west from September to March; the prevailing winds during this period being from that quarter.

The best position is within Diamond rock, with St. Saviour church tower just open northward of St. Mark church-spire, and in line with the high rock between Gros du Château and La Vrachère E. by N. $\frac{1}{4}$ N.; or fort Regent signal-post seen over Elizabeth castle and in line with Gros du Château bearing E. $\frac{1}{4}$ N. and La Haule house in line with the outer or north-east extreme of St. Aubin castle breakwater N. by W. $\frac{1}{4}$ W., in

20 feet at the lowest spring tides. This spot is N.N.E. nearly 2 cables within the Diamond rock.

Vessels wishing to lie as near as possible to St. Helier, may anchor in 5 fathoms at low water, with La Haule house in the same line of bearing, but St. Mark church-spire touching the south-east side of Hermitage rock N.E. by E.

This last position should only be used by vessels under the above circumstances in fine or moderate weather, but at or near the first described anchorage within the Diamond rock, vessels of not more than 18 feet draft might ride out a heavy southerly gale in safety, as they would be sheltered from the strength of the tidal stream; also below half tide the ocean swell is broken by outlying rocks. During neap tides, vessels of 22 feet draft might safely anchor inside the Diamond rock, but for larger draft there is no safe anchorage on any part of the south coast in very bad weather.

The anchorage in the best part of the Little road lies to the northward of Grande Mangeuse rock, in 10 feet water, with fort Regent signal-post over the middle of the entrance to the harbour E.N.E., and Noirmont signal-post touching the south-west side of Close rock N.W. by W.: or farther out in 16 feet, with fort Regent signal-post a sail's breadth open to the south-east of Victoria pier lighthouse, and Elizabeth castle flagstaff in line with a remarkable pointed rock eastward of the Hermitage N. by W. $\frac{1}{2}$ W. Vessels intending to remain in the Little road should always moor, for the anchorage space is only $1\frac{1}{2}$ cables wide N.W. and S.E., although nearly one quarter of a mile long, N.E. and S.W., and it is surrounded by dangerous sunken rocks.

PASSAGES into ST. AUBIN BAY.—There are nine passages leading into St. Aubin bay, viz.: The North-west, the Western, the South-west, the Sillette, the Danger rock, the Middle, the Hinguette, the South, and the Eastern.

In westerly gales the best time to pass through any of these rocky channels is between first-quarter flood and high water. The first of the ebb throws up a very dangerous overfall off Noirmont point, and when the westerly tide has fairly made, overfalls extend across all the channels, which continue with more or less intensity, according to the height of the ocean swell and strength of the wind, until the ebb tide slacks.

NORTH-WEST PASSAGE, although only $1\frac{3}{4}$ cables wide at the narrowest part between point Le Fret and the rocky bank of that name off it, is safe, and has not less than 7 fathoms at low water in any part. It is indeed more frequently used than the other channels, being the steam-packet route between Southampton, Guernsey, and St. Helier.

Directions.—Having rounded the Corbière, as directed at page 267, and passed between La Moye point and Banc de St. Brelade, by shutting in La Motte with Noirmont point, and having Noirmont tower on the line of bearing S.E. by E. $\frac{1}{2}$ E.; run direct for the tower until the peak of Corbière rock is seen touching La Moye point, bearing N.W. $\frac{1}{2}$ W.; with this mark the vessel will pass through the middle of the narrowest part of the channel off Le Fret point, in 8 fathoms. Continue on the same line until the white patch on the sea-wall at Grève d'Azette comes in line with Dogs Nest rock, bearing E. by S.; this mark leads through near the middle of the channel between Noirmont point and the rocky reefs off it, called the Fours; it also leads nearly $1\frac{1}{2}$ cables inside the Rouaudière rock, and exactly midway between Les Cloches and the 7-feet rock lying a cable outside Oyster rock beacon.

After passing Oyster rock beacon, St. Mark church spire will soon come in line with the white patch at the south end of Albert pier, which is the mark for entering the Little road; but after passing inside the Platte rock bring the church spire in line with the northern white patch on Albert pier, to clear the Mangeuse rocks.

A description of the dangers off and within the Little Road, as well as anchoring marks, will be found at pages 274 and 275, and a description of the Little Road, together with directions for entering, will follow at pages 281 and 283.

WESTERN PASSAGE between the Hubaut reefs and the Banc de St. Brelade, is rather more than one quarter of a mile across at its most contracted part, which is between the Petite Grune and Banc le Fret; and there is here 9 fathoms water in it. It is the most direct route to St. Aubin bay and St. Helier harbour from the westward, one leading mark only being required, viz., the white patch on the sea wall at Grève d'Azette in line with the white patch and iron beacon on the Dogs Nest rock; but as these marks are not easily made out in misty weather, and might then be mistaken, the North-west passage is probably the best for a stranger to take.

Directions.—The line of the white patch on the sea wall at Grève d'Azette and the Dogs Nest rock bearing E. by S., passes very little more than half a cable northward of the Petite Grune, and almost touches the north side of a sunken rock with only 14 feet water lying half a mile outside or to the westward of the Petite Grune; therefore in entering the channel from the westward, keep the Corbière rock well open outside Jument (white), until the white patch in the sea wall at Grève d'Azette is seen clearly open to the northward of Dogs Nest rock. Run in on this mark, keeping them open, until Tabor chapel comes in line with Le Fret

point, to clear the Petite Grune, after which they may be brought in line and used as the leading mark up to the entrance of the Little road, as directed above, on passing through inside the North-west passage.

Should the white patch at Grève d'Azette be obscured, De Pas tower in line with Noirmont tower will do equally well, provided the Hermitage rock is opened out clear of Noirmont point before shutting in Tabor chapel with Le Fret point, to clear the 20-foot rock lying eastward of Banc Le Fret; and if all objects to the eastward and near the town are invisible and the land about Noirmont and Le Moye be tolerably clear, which is often the case in very fine weather, Noirmont point may be approached to the distance of a cable; but in passing eastward of it do not shut in Le Moye signal-post with Le Fret point until St. Aubin castle is seen open of the land of Noirmont, in order to clear a dangerous rock lying between and without the line of Noirmont tower and Pignonet beacon. After passing Pignonet beacon bring Noirmont tower a little open to the north-eastward or inside of it, and when about a quarter of a mile to the eastward of the beacon anchor until the weather clears.

SOUTH-WEST PASSAGE is between the Banc Les Vrachère and the Grunes Vaudin; to the eastward of the Grande Grune and westward of the Grand Four. The narrowest part of the channel is between the 6-foot sunken rock at the north-west side of the Grand Four, and another sunken rock with 20 feet over it; these rocks are 2 cables from each other W.N.W. and E.S.E.

Directions.—Captain Saumarez's house, a yellow building named the Firs, about half way up the slope of the hill a little eastward of St. Matthew church, in line with Noirmont tower bearing N.E. $\frac{1}{4}$ E., leads midway between the Frouque of the Vrachère and the westernmost of the Grunes Vaudin; enter the channel therefore on this line and run on it until the white patch in the sea wall at Grève d'Azette comes in line with the white patch on Dogs Nest rock E. by S. southerly, with which as a leading mark proceed to the eastward as before.

As the leading mark through this channel leads dangerously close to the west side of the Grand Four, it is recommended when the flood tide is running, that vessels should only run in on it so far as to bring Tabor chapel open and shut over the upper part of the slope of Le Fret bluff, and run on this line until the eastern leading mark comes on as before.

Tabor chapel, standing on the high land overlooking St. Brelade bay, is here given as the most conspicuous mark for a stranger to recognize, but this leading line approaches the Grande Grune rather nearer than is desirable; for the middle of the channel, Tabor chapel should be shut in altogether, and the Pic-nic hotel (white gable), situate in the bay on the

low land to the westward of it, brought in line with the extreme of point Le Fret.

As there are overfalls and strong eddies from the rocks in this channel on both ebb and flood, it should never be taken from choice except in very fine weather.

SILLETTE PASSAGE is between the Sillette rocks and the Grunes aux Dards, which is the narrowest part of it, the channel here being 2 cables wide, with an average depth of 6 fathoms; but a large sunken rock occupies the middle of the fairway, and as it has only 26 feet over it at low water, not more than this can be counted on.

Directions.—The Sillette passage should never be attempted in a sailing vessel without a fair commanding wind, as the tidal stream both ebb and flood sets right across it. The leading mark is the western martello towers (white) in St. Aubin bay in line with the east side of Grosse rock, on which there is a beacon, bearing N. by E. $\frac{3}{4}$ E. This line leads barely $1\frac{1}{2}$ cables eastward of the sunken rocks at the entrance of the channel called Les Poches à Suie, on which there are only 4 feet water; midway between the Sillette and Grunes aux Dards, nearly $1\frac{1}{2}$ cables eastward of the Petit Four; $1\frac{1}{2}$ cables eastward of the Pignonet; half a cable westward or inside the Grunes du Port, and very close inside the western head of Junée.

MIDDLE PASSAGE is between Danger rock and the Grunes aux Dards to the westward, and Les Têtards, the Hinguette reef and the Grunes St. Michel to the eastward. The apparent narrowest part of the passage is more than half a mile across, this being the distance between Danger rock and the Grunes St. Michel; but there are two sunken rocks with only 14 and 15 feet over them at low water, lying outside or to the southward of the Grune St. Michel, distant from it nearly half a mile, thus breaking up the channel into two parts. The westernmost rock of the two, 15 feet on it, occupies a position near the middle of the channel at its entrance, and bears from Danger rock E.S.E. nearly half a mile. The best part of the middle passage lies between Danger rock and this 15-foot rock; the ground here is clean and the soundings regular in 7 fathoms; the eastern side of the Middle passage is rocky, and the depths irregular.

Directions.—Mount Plasir house touching the western side of St. Aubin castle-tower bearing N. $\frac{1}{4}$ W., is the leading mark through the Middle passage. This line leads nearly $1\frac{1}{2}$ cables westward of the 15-foot sunken rock; a quarter of a mile east of Danger rock, and rather less from the Frouquie of the Grune aux Dards, on which there are 5 feet at low water; nearly 2 cables westward of the Rouaudière, $1\frac{1}{2}$ cables

NORTH PASSAGE

The North Passage is a narrow strait between the mainland and the islands. The water is very shallow and the current is very strong. The passage is very dangerous and is only used by small boats.

Directions

From the mainland, the North Passage is reached by following the coast to the north. The water is very shallow and the current is very strong. The passage is very dangerous and is only used by small boats.

HINCHIN PASSAGE

The Hinchin Passage is a narrow strait between the mainland and the islands. The water is very shallow and the current is very strong. The passage is very dangerous and is only used by small boats.

Directions

From the mainland, the Hinchin Passage is reached by following the coast to the north. The water is very shallow and the current is very strong. The passage is very dangerous and is only used by small boats.

SOUTH PASSAGE

The South Passage is a narrow strait between the mainland and the islands. The water is very shallow and the current is very strong. The passage is very dangerous and is only used by small boats.

Directions

From the mainland, the South Passage is reached by following the coast to the south. The water is very shallow and the current is very strong. The passage is very dangerous and is only used by small boats.



mid-channel, and, as before stated, between Les Cloches and up to the entrance of St. Helier Little road; but should it be desired to proceed to the anchorage in St. Aubin bay—when St. Peter church-spire comes in line with the lower Blanc Pignon N. by W. $\frac{1}{2}$ W., take it for the leading mark up to the anchorage.

When near low-water St. Peter church-spire may be lost sight of before arriving at the anchorage in St. Aubin bay, in which case care must be taken to refer the line of its direction to some other object.

EASTERN PASSAGE.—The narrowest part of the passage is between Demie de Pas on which there is a beacon pole, and a sunken rock with 11 feet water. The latter rock lies W.N.W. nearly one third of a mile from Demie de Pas, and from it the 9-feet rock (see page 273) bears N. $\frac{1}{2}$ W. nearly a cable. The ground outside Demie de Pas is clean up to the foot of the rock, which is not more than 40 yards from the beacon.

Directions.—The new mill on the beach at Millbrook, just in sight or open and shut of the high rocks on west side of the Hermitage bearing N. $\frac{1}{2}$ W., leads $1\frac{1}{2}$ cables westward of Demie de Pas, and barely a cable eastward of the sunken rocks above described. A vessel may therefore enter the channel on this line, and run on it until Nicolle tower comes in line with Tas de Pois rock (white) after which St. Matthew church must be brought in line with Gros de Chateau rock, as for the South channel, to run up to the entrance of the Little road; or St. Peter church spire in line with Lower Blanc Pignon to approach the anchorage in St. Aubin bay.

ST. HELIER LITTLE ROAD lies eastward of the Hermitage rocks, and is frequented only by vessels intending to enter the harbour at tide time, or during the neaps, in fine weather, with off-shore winds. The depth in it is from 16 to 6 feet, at low-water springs, but the anchorage is so much contracted by rocks that vessels over 8 feet draught would be compelled to moor. At low-water springs the Little road is completely sheltered on the east by a rocky barrier entirely dry, extending from Point de Pas to the Dogs Nest rock; there is also a chain of sunken rocks on the west side of the Little road, extending from the Hermitage to the Oyster rocks and beyond to the distance of one cable outside the beacon; there are narrow gaps of deep water through this rocky barrier, but they are too tortuous to be available as ship channels, therefore no vessel of greater draught than 5 feet should attempt to pass this barrier at low water.

The principal dangers in the Little road are described at page 275.

Directions.—When bound from St. Aubin bay into the Little road of St. Helier harbour, it is best to weigh and proceed about half flood;

at which period there will be 16 feet water between the pier heads of Victoria harbour and 8 feet between the pier heads of the Old harbour; at the highest springs there are 36 feet at the entrance of Victoria harbour, and 27 feet between the pier heads of the Old harbour.

From the anchorage in St. Aubin bay into the Little road, inside or to the northward of the Oyster rock—steer towards the middle of the passage between the Oyster rock and the hermitage; being careful not to open Almorah terrace to the eastward of the latter until the iron pole beacon on the Grande Mangeuse rock is in line with the outer or southern high chimney of the engineers' barrack, a long brick building on point de Pas adjoining the north side of the tower, bearing E. $\frac{1}{4}$ S. With this mark on a vessel may run through a gap in the barrier reef, in not less than 8 feet at low water. When South-east rock off the east side of Hermitage is shut in with Elizabeth castle she will be within the limits of the anchorage in the Little road, and may anchor as convenient or proceed into the harbour; in the latter case St. Mark church-spire in line with the northernmost white patch on the Albert breakwater is the leading mark up to the entrance.

The width of this gap in the barrier reef is only 60 yards; it is bounded to the northward by a small rock that dries a foot at low water, and to the southward by a sunken rock with 2 feet over it at that period.

Outside the Oyster Rocks from the Westward.—The channel between the westernmost of Les Cloches with 8 feet water, and the outer sunken rock off the Oyster with 7 feet over it, is $1\frac{1}{2}$ cables wide and has 5 fathoms in at the lowest spring tides. The white patch on the sea wall at Grève d'Azetta and the Dogs Nest rock beacon in line leads through the middle of it; run on this line therefore until St. Mark church-spire comes in line with the white patch at the end of Albert pier N.E. $\frac{1}{4}$ E., with which mark enter the Little road; but after arriving inside Platte rock, edge away to the northward until St. Mark church-spire is in line with the northernmost white patch on the same pier; which, as already stated, will lead to the anchorage in the Little road or up to the entrance of the harbour.

From the Southward.—Pass between Les Cloches with St. Mark church spire in line with Victoria pier-lighthouse N.E. $\frac{1}{4}$ E.; when inside the Oyster rocks, St. Mark church-spire should be brought in line with the white patch at the end of Albert pier; and after passing the Platte, St. Mark church-spire should be brought in line with the northern white patch on Albert pier as before.

From St. Aubin Bay over the Bridge to the Little road or St. Helier harbour—Steer so as to pass half a cable northward of La

Vrachère rock, with a small beacon pole on it, or bring St. Mark church-spire on with the north side of the hospital, and run with this mark on until De Pas tower opens a little to the northward of the northernmost white patch on the Albert pier, with which run over the bridge (this part has one foot water at half tide) and enter the harbour, or haul out into the Little road.

BY NIGHT.—Bring the Victoria pier white light to bear N.E., and steer for it, until the *green* and *red* lights on Albert pier are in line bearing N.E. $\frac{1}{4}$ N.; which mark will lead between the Hinguette rock and Grune St. Michel, up to the anchorage in the small road, or to enter the harbour, care being taken to observe the precautions as directed in page 270.

CAUTION.—In entering the harbour, allowance must be made for the tide, which at or near springs runs in and out with considerable strength. The most dangerous period for vessels entering is about half flood; at such times they are frequently forced over against the sandbank fronting the south pier of the old harbour before they have time to turn their heads up the harbour.

GENERAL DIRECTIONS.—Small vessels when working up towards the narrows of the western channels, may when to the eastward of the Kaines stand into St. Brelade bay until Jument rock (white) is open and shut of La Moye point; and to the southward until Elizabeth castle is just seen in line with Noirmont point E. $\frac{1}{2}$ S. When in the narrows of the western channel, backing and filling is recommended with a beating wind; if with the flood, with the vessel's head off shore, and if with the ebb, with her head in shore; unless one half the flood at least has run, for at this period half tide there are 13 feet over all the rocks in the offing of St. Aubin bay, with the exception of the Pignonet, Hinguette, and Sillette, on which there are only 9, 8, and 7 feet respectively.

If bound into the Little road or St. Helier harbour, in order to avoid the Rouaudière, it may be useful to remember that St. Mark church-spire touching the south side of Close rock leads 60 yards to the northward of it; and the same spire in line with the False Hermitage leads to the southward.

A vessel from the north-westward running for shelter in St. Aubin bay during a gale from that quarter, should keep at the distance of $1\frac{1}{2}$ miles from the Corbière to avoid the breaking sea near it, especially necessary from half ebb till low water, and when the land of Noirmont is well open steer for its point, until Grosnez point comes in line with the Corbière, after which haul up for La Moye and bring the marks on for the north-west channel (page 277), where much less sea will be found than in the others.

In heavy westerly gales the whole space included between the outlying rocks off Noirmont point is a confused mass of foaming breakers; clouds of driving spray create an impenetrable mist that obscures all marks near the horizon, and beacons marking the rocks are all out of sight under water; but even under such circumstances the North-west passage could be safely taken by a person well acquainted with it, as both Le Fret and Noirmont points are safe of approach for large vessels to the distance of a cable.

On arriving abreast of Noirmont point attend to the directions given at pages 277 and 315 or do not shut in La Moye signal-post with Le Fret point, until the white tower in St. Aubin bay is seen open eastward of St. Aubin castle to clear the Pignonet rocks, the first of the flood sets right on these rocks into St. Aubin bay. It may be useful to remember that when La Haule house comes on with the inside part of the wall extending to the westward of St. Aubin castle the vessel will be midway between the Grunes du Port and the Diamond rock; and that St. Saviour church tower just open northward of St. Mark church-spire and in line with La Vrachère rock will lead up to the anchorage in St. Aubin bay, well clear of the Diamond rock.

Tides.—It is high water, full and change, in St. Helier's harbour at 6h. 29m., springs rise $31\frac{1}{2}$ feet, neaps 23 feet. The flood runs 3 knots and the ebb about 2 knots in the entrance of the harbour.

The COAST eastward of St. Helier is all low and sandy to La Roque point, also to the northward of La Roque point as far as Mount Orgueil bluff; the whole of which part is inaccessible to shipping, from the extensive rocky reefs with which it is fringed, and which dry at low-water spring tides to the distance of nearly 2 miles from the shore.

The outer edge of this reef to the southward is generally steep, and fortunately well marked by a number of large rocks, which although sometimes nearly awash at high water, are never entirely covered. There are also two stone towers on this reef, each about 45 feet above high-water level; one lying about 3 miles S.E. of the Little road of St. Helier, called Icho tower; the other Seymour tower, situate nearly 2 miles further eastward, near the middle of the Violet bank, off La Roque point.

Violet Bank, above referred to, is the name applied to the eastern part of the great reef lying eastward of St. Helier. It stretches out rather more than 2 miles from La Roque point, at the south-east extreme of Jersey, and consists of gravel, shingle and sand, interspersed with numerous ledges of sharp pointed rocks; the whole of which dries at low-water spring tides. The greater part of this bank covers at half flood; there is then a foot water on the ridge of sand and shingle ex-

tending from La Roque point to Seymour tower; this spot is near La Roque point where the Ridge is lowest, and most favourable for the passage of boats. At high water the bank is entirely covered, and is then only marked by La Conchière rock at its south extreme; Seymour tower near the middle; Karamé rock, at this time awash, on the south-east; and Little Seymour rock, also awash, but marked by a pole and basket beacon, near its eastern side.

From half flood to half ebb the stream runs with great velocity over the Violet bank, attaining the rate of 6 knots at springs, in a N.E. and S.W. direction.

As before remarked, the reef eastward of St. Helier, as well as the southern edge of the Violet bank, is well marked by conspicuous rocks; which, together with the dangers along this line, will now be described.

Dogs Nest Rock, as already stated at page 281, is situate near the outer extreme of a rocky ridge stretching out from Point de Pas, and forming the eastern boundary of the Little road of St. Helier; it is nearly awash at high water, and its apex is marked with three white spots, and surmounted by an iron pole and ball beacon.

Tas de Pois, or White rock, lies three fourths of a mile S. by E. $\frac{1}{2}$ E. from the Dogs Nest rock. Although only elevated 5 feet above high-water springs, it is very remarkable, from its upper part being well whitewashed all round, and from there being another rock rather larger and black, 2 cables eastward of it.

White rock is fronted to the westward for $1\frac{1}{2}$ cables by dangerous rocks that never show; and a quarter of a mile to the N.W., lies a rocky group that uncovers about half tide. A chain of rather high rocks extend from White rock to the shore.

La Frouquie, three-quarters of a mile S.E. $\frac{3}{4}$ S. from White rock, is 4 feet lower than White rock, and therefore awash at high-water springs. A chain of high rocks extend from La Frouquie to point Le Croc; the inner and highest of which is named La Motte. This line of rocks marks the limit of the first bay eastward of St. Helier, known as La Grève d'Azette. The coast included between La Motte and La Roque point is called St. Clements bay. A dangerous reef extends one quarter of a mile S.W. from La Frouquie.

Demie de Pas, the westernmost of a cluster of rocks situated W.N.W. half a mile from La Frouquie, and nearly the same distance in a southerly direction from White rock, dries 20 feet at low water, is steep-to outside, and marked by a pole beacon.

La Moye signal-post in line with Le Fret point bearing N.W. $\frac{1}{2}$ W. leads $1\frac{1}{2}$ cables outside all the rocks off Demie de Pas and La Frouquie.

Between La Frouquie and Icho tower there are no rocks visible at high water to mark the outer edge of the reef, but at half tide and under, it is well marked by Rouget rock, which stands close to the edge of deep water, and which bears S.E. $\frac{1}{4}$ S., distant five-eighths of a mile from La Frouquie. Also by Jinquet rock, which dries 25 feet, and lies half a mile E.S.E. from Rouget rock. A third of a mile to the eastward of Jinquet rock lies the Grande Frouquie, which is always 7 or 8 feet above water at the highest tides, and which lies about 3 cables westward of Icho tower.

ICHO TOWER is surrounded by high rocks, being in this respect different from Seymour tower, which at and above high tide appears to be completely isolated, and rises at once from the sea.

L'Echiquelez Rock is one of the principal sea marks near Icho tower, from which it bears S. by E., distant nearly half a mile. It is elevated 5 feet above the highest spring tides; is steep-to on the outside to the westward; but $1\frac{1}{2}$ cables to the southward there is a half-tide rock; whilst to the N.W. are several dangerous rocks, the farthest of which dries 5 feet at low water, and lies 2 cables S.S.W. from the Grande Frouquie.

Between Echiquelez rock and La Conchière the edge of the reef makes a line convex outward for the distance of nearly a quarter of a mile.

Icho Bank, a dangerous bank of sunken rocks forming an irregular ridge in a N.N.W. and S.S.E. direction, about $4\frac{1}{2}$ cables long, and $1\frac{1}{2}$ cables broad, lies S.W. $2\frac{1}{2}$ miles from Icho tower.

The least water, $2\frac{1}{2}$ fathoms, will be found on the north extreme of the bank, and from this shoal spot La Platte Roque tower is just seen on the west side of Icho tower N.E. $\frac{1}{4}$ E.; and St. Peter's church-spire open a little to the eastward of Lower Blanc Pignon house, N. by W. $\frac{1}{4}$ W. On other parts of the bank there are from 3 to 5 fathoms at low-water springs.

The channel between this bank and the rocks fronting Icho tower is 2 miles wide and clear of danger.

La Conchière Rock lies on the line of Orgueil castle and Seymour tower, distant 2 miles from La Roque point at the south extreme of the Violet bank; it dries 41 feet at low-water springs, and is therefore never covered, although sometimes awash. A reef extends from it to the southward for the distance of about a cable; Conchière rock should not therefore be approached nearer than a quarter of a mile.

Clearing marks, for the line of reef just described, between La Frouquie and La Conchière rocks.—Keep the peak of Corbière rock just in sight touching La Moye point, until the Grand Anquette beacon comes open outside of La Conchière rock.

VIOLET CHANNEL.—A sunken reef commences at La Conchière rock, and extends to the eastward on the line of L'Echiquelez and Conchière rocks to the distance of $1\frac{1}{2}$ miles. Within this line, and northward of it for rather more than a mile, the entire space is shoal water, and rocks innumerable; so that at low water it would be difficult for a stranger to pick his way through them even in a boat. From La Conchière rock to the eastward the outer or southern edge of this reef is well marked, at the last quarter ebb, by a long string of rocks called La Route en Ville; its eastern extreme is bounded by a sunken rock called the Petit Four; and it may be said to extend to the northward as far as Le Cochon, La Noire, and the Grand Haisse rocks.

The navigable part of the Violet channel lies between the sunken part of the Violet reef just described, and the rocky banks to the southward called the Plateau de la Fourquie (on which are La Goubinière and La Rousse Platte rocks), and the Anquette rocks to the eastward. The narrowest part of this channel lies between the Petit Four and the sunken rocks inside the Petite Anquette rock, where it is about half a mile wide.

Anquette Channel leads from the middle of the Violet channel out between the Grande and Petite Anquette rocks to the eastward. The water is deeper here than in the Violet channel, but, from the absence of good leading marks, the passage is more difficult. The general depth in it is 6 to 7 fathoms, and there are 5 to 6 fathoms in the Violet channel at low water; but in the latter on the line of Princes tower and Little Seymour beacon, and with the Grand Anquette beacon bearing E. $\frac{1}{2}$ S., is a rock with 23 feet water, and another near it with 25 feet; both these rocks were repeatedly examined, but it is possible nevertheless that there may be 3 or 4 feet less water than is here given.

Caution is therefore necessary in passing this part of the channel at low water, in large ships. In vessels above 15 feet draught it will be prudent to wait until the flood tide has fairly made, and with any swell on, such vessels should not pass until first-quarter flood.

DANGERS in VIOLET CHANNEL.—La Conchière rock, described at preceding page, is the principal mark at the western entrance of the Violet channel.

Taxé lies to the eastward of La Conchière, distant from it rather more than half a mile, and exactly on the line of La Conchière and Echiquelez rocks; it dries 10 feet at low water.

A quarter of a mile eastward of Taxé rock; with Echiquelez rock a little open southward of La Conchière, lies the highest of the western rocks of the Route en Ville, which dries 11 feet; and there is another rock a cable eastward of it, which dries 10 feet at low water.

From these rocks to the eastward, about half a mile, lying close to the deep water, the Route en Ville chain extends on a line convex outward. Most of the rocks are nearly awash at low water.

St. Martin church-spire in line with Gorey tower N. by W. passes over a rock with only 2 feet water, lying half a cable within or westward of its eastern end. They will be cleared on the south-west side by keeping Icho tower open a little outside of Conchière rock, until Princes tower comes in line with Seymour tower; after which keep Echiquelez rock open South of Conchière until Princes tower comes in line with No. 5 tower.

Petit Four, with 2 feet water, marks the eastern extreme of the Violet reef; it lies with Karamé rock just shut in with the outer part of the high table-land above Noirmont point N.W. by W. $\frac{1}{4}$ W. The sentry box of Cope guard-house, a stone turret on the apex of Coupe bluff, over the end of the bluff just within the breakwater-house at Verclut point, N. $\frac{1}{4}$ W.; and the Grande Anquette beacon on the north side of Petite Anquette rock S.E. by E. $\frac{1}{4}$ E.

La Goubinière Rock dries 20 feet at low water; it lies on the western end of the Plateau de la Frouquie, a very little to the eastward of the line of Orgueil castle, Seymour tower, and Conchière rock; distant from the latter nearly $1\frac{1}{4}$ miles. On the rock, La Moye signal post is seen over the outer part of Le Fret point N.W.

There are several rocks to the northward of La Goubinière, the outer of which, named Canger rock, dries 16 feet at low water, and lies a cable from it.

Orgueil castle a little open to the westward of Seymour tower and Conchière rock clears the Goubinière and all dangers on the west side of the Plateau de Frouquie.

Frouquie Aubert Rock lies on the south-western edge of the Plateau de la Frouquie, $1\frac{1}{4}$ miles south-eastward of the Goubinière; it uncovers 26 feet at low water, and does not cover at neaps. From it St. Peter's church spire is in line with the white patch on South hill N.N.W. $\frac{1}{4}$ W., and St. Martin church spire is a good sail's breadth open north-eastward of Seymour tower N. $\frac{3}{4}$ W.

La Rousse Platte Rock marks the east side of the Plateau de la Frouquie, and lies E. $\frac{3}{4}$ S. rather more than a mile from La Goubinière; it is a large flat rock about half a cable in diameter, and dries 14 feet at low water. Between this rock and La Goubinière are several rocks one of which dries 15 feet at low water; another which dries only 4 feet, is however the most dangerous, from standing more prominently out in the channel.

Pierre des Enfants Rock lies one quarter of a mile to the southward of Rousse Platte, and being 7 feet higher makes a very useful mark when Rousse Platte is covered by the tide.

ANQUETTE ROCKS lie $2\frac{1}{2}$ and 3 miles eastward of Conchière rock and form the eastern boundary of the Violet channel. The Petite Anquette uncovers 20 feet at low water. From it La Bergerie, a remarkable house on the heights above Noirmont point, is in line with the north side of La Motte rock N.W. by W.; and Archirondel tower appears its apparent breadth open north-eastward of Rozel manor-house N. by W. $\frac{3}{4}$ W.

Seal Rocks.—An extensive reef lies off the Petite Anquette to the northward, one of the most dangerous clumps on which are called the Seals. The westernmost Seal dries 4 feet, and lies about N.N.W. a third of a mile from the Petite Anquette. There is a sunken rock with only 12 feet water, lying an eighth of a mile to the westward of the western Seal. Also a dangerous clump called La Maraine Reef, which lies N.N.E. nearly three-quarters of a mile from Petite Anquette, having only 3 feet water on it. All these rocks are probably connected with the Petite Anquette.

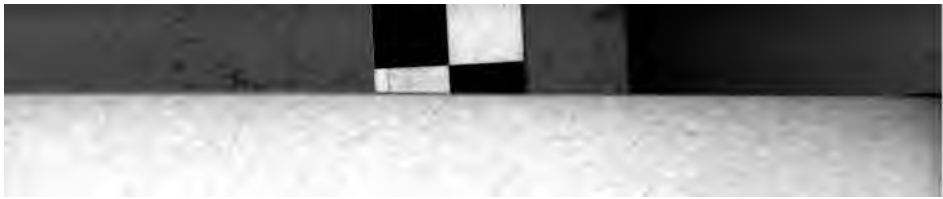
Grune Le Feuvre lies N.E. $\frac{3}{4}$ N. $1\frac{1}{2}$ miles from Petite Anquette, and has only 6 feet on it at low water.

Grande Anquette Rock lies S.E. $\frac{1}{4}$ E., $3\frac{5}{8}$ miles from Seymour tower; it formerly covered about 8 feet above half tide, but is now marked by a stone pillar beacon, painted in horizontal bands of red and white, 20 feet above high water, and surmounted by staff and ball. From the beacon Petite Anquette rock bears N.W. by W. $\frac{1}{4}$ W., three-quarters of a mile; Rousse Platte rock W. $\frac{3}{4}$ S. $2\frac{1}{4}$ miles; Grande Arconie, which dries 9 feet, S.S.E. $\frac{1}{4}$ E., one mile; and Porpoise rock S.W. by W. $\frac{1}{4}$ W., seven-eighths of a mile.

Anquette Patches, a small rocky bank with 16 to 20 feet on its east end lying N.E. $\frac{1}{4}$ N. nearly a mile from the Grande Anquette. Seymour tower is in one with La Motte rock W.N.W.; and Rozel mill twice its apparent breadth open west of St. Catharine tower, N.N.W. $\frac{3}{4}$ W. Another bank of rock and gravel lies E. by S. $\frac{3}{4}$ S., 2 miles from the Grande Anquette. Its shoalest part 15 feet, lies with Rozel windmill a little open eastward of St. Catharine's tower N.W. by N., and Grande Anquette and La Conchière rocks in line W. by N. $\frac{3}{4}$ N.

Sunken Reef.—There are some dangerous sunken rocks lying one quarter of a mile S.E. of the Anquette beacon; and the space to the southward of it for the distance of $1\frac{1}{2}$ miles is occupied by a vast reef called by the French Plateau de l'Arconie; some of the rocks on which begin to uncover soon after the last quarter ebb of a spring tide, others are only awash at low water, and by far the largest part of them never appear at all.

La Grande Arconie Rock which dries 9 feet at low water stands on the east side of this plateau; the Porpoise rock drying 4 feet marks its western boundary; the Grand Four rock, drying 7 feet, lies just within its



south-west extreme ; and La Hauche rock, drying 6 feet, and a mile south-eastward of the latter.

The channel between Plateau de la Frouquie and Plateau de l'Arconie has $5\frac{1}{2}$ fathoms at low water, but its free navigation is impeded by a string of rocks extending across, between Pierre des Enfants and the Grand Four, about a cable apart ; some of which are awash, and others have 5 feet over them at low-water springs.

The great strength of the stream at this part of the channel, and the absence of good marks, render its navigation extremely perilous near low water ; no vessel should attempt to pass through, therefore, until after first quarter flood.

Coupe guard-house turret perceptibly open outside the breakwater-house of Verclut point (same mark as for northern entrance of the Violet channel), will lead through the best part of the channel, but even this line leads over one of the rocks, which must be avoided, and after passing it, haul out gradually round Frouquie Aubert.

ANQUETTE GRAVEL BANKS commence near the south-west extreme of the Plateau des Arconies and extend to the south-eastward in an almost continuous line, for a distance of 5 miles. They consist of a number of narrow ridgy banks of fine gravel, having generally a depth of 3 and 4 fathoms at low water, excepting on one detached bank near the end, where there are only 2 fathoms. The marks for this spot are, La Moye signal-post just inside, or to the northward of Frouquie Aubert N.W. $\frac{1}{4}$ W., and Grande Anquette a little within Verclut point N. by W. $\frac{3}{4}$ W.

There are good 7-fathom channels on either side of this bank.

Directions.—If bound from St. Helier to the eastward, through the Violet channel, after having cleared the dangers outside the Little road, according to directions already given for entering, proceed with La Moye signal-post in line with Le Fret point, bearing N.W. $\frac{1}{4}$ W., until Orgueil castle comes on with Icho tower ; at which position, about half a mile from the outer edge of the reef, the Grande Anquette beacon will be seen a little open of Conchière rock E. by S. $\frac{1}{2}$ S.

From hence steer S.E. by E. $\frac{1}{4}$ E., parallel to the outer edge of the reef ; the depth along this line will be 5 to 7 fathoms at low water. Conchière rock will be passed at the distance of about one-third of a mile ; and when to the eastward of it, bring Echiquelez rock in line with Noirmont tower, N.W. $\frac{3}{4}$ W., for a leading mark, until Princes tower comes in line with Seymour tower ; near the intersection of these lines the Platte Rousse will bear S.W., one third of a mile, and the Grande Anquette beacon East. Steer now N.E. northerly to pass through the deepest part of the channel, or East for the Grande Anquette beacon to pass through the middle of it,



until La Coupe mound is open eastward of Verclut point, N. $\frac{3}{4}$ W., with which mark run up to abreast the Petit Four.

As the narrowest part of the channel lies between the Petit Four and Petite Anquette, it may be useful to know that the stone turret on Coupe point, and the breakwater house at Verclut point, exactly in line N. $\frac{3}{4}$ W., leads a cable outside the Petit Four; at this position Rozel windmill is seen touching the north side of mont Orgueil castle N. by W. $\frac{1}{2}$ W., and St. Catherine's tower (white) is in line with Archirondel tower (red). When abreast Petit Four, Karamé rock will be seen just shut in with the high land above Noirmont point, N.W. by W. $\frac{1}{2}$ W., and the Grande Anquette beacon on the north side of Petite Anquette, S.E. by E.

From this position, the same leading mark, viz., La Coupe mound open eastward of Verclut point, N. $\frac{3}{4}$ W., will lead up inside the Banc du Chateau, past the Giffard rock, to the anchorage in Gorey road. After passing Giffard rock these objects should be brought exactly in line to pass through the centre of the channel.

If it be desired to haul out to the eastward of the Chateau bank, a small vessel may do so when Echiquelez rock comes open north of Karamé rock, but a large vessel should not attempt it until Ichó and Seymour towers are in line, to avoid some stony banks lying to the northward of Grune le Feuvre, on which there is only 25 feet at low water.

GROUVILLE BAY, which derives its name from a hamlet near St. Clement church, is situated on the east side of Jersey, between La Roque point and mont Orgueil. Its outer boundary to the southward commences on the north-east side of the Violet bank, and is very rocky; there are numerous clumps of rocks scattered along the low-water line of the bay to the northward, which dries out to the distance of a mile from the shore; there are also many rocks within this line as well as without; nevertheless the beach of Grouville bay, at low water, presents a coast scene of great beauty; consisting of a vast expanse of fine white sand, rising with a gentle slope towards the shore, bounded on the south in the distance by the rugged rocks of the Violet bank and Seymour tower, and on the north by the stately mont Orgueil, crowned by its venerable castle.

GOREY HARBOUR immediately under mont Orgueil castle to the south-west, is formed by a stone pier built out from the south-west part of Orgueil head. The accommodation for vessels is very limited; the outer pier berth having only a depth of 9 feet at half tide, and at low-water springs the sand dries for the distance of a cable outside the pier-heads; nevertheless vessels of 300 tons may occasionally be seen here, and as it is the headquarters of the oyster fishery, there are a large number of sloops from 30 to 50 tons burthen belonging to the place. Immediately off the outer end



of the pier, and at the distance of 400 feet from it, there is a space of ground paved with flat stones for depositing the oysters. This place is marked by a rough pole beacon near its north-eastern end, at the distance of 60 feet from its outer edge. With this exception the bottom of Gorey harbour is good for grounding vessels, consisting of mud and sand.

LIGHT.—From Gorey pier head a *fixed* white light is exhibited at an elevation of 35 feet above high water.

Caution.—At spring tides and after half flood, the stream sets with great force round the pier-head to the northward, for which due allowance must be made. Sharp vessels not provided with legs should always get a pier berth, and list in, assisted by their mast-head tackles on shore, to prevent their falling over at low water. During the severe gales in winter a vessel will strain less in taking the ground, be much better sheltered, and will experience far less scend in this harbour than in any other in the Channel islands.

DANGERS.—**The Equerrière.**—Among the most prominent dangers in Grouville bay is the Equerrière, the largest and most conspicuous rock off Gorey harbour, from which it is distant one third of a mile; it dries 35 feet, and is marked by a pole and fish-tail beacon.

Dasher Rock with 2 feet water and 18 to 20 feet close to, lies S. by W. $\frac{1}{4}$ W. about one cable from Equerrière rock.

The Ecureuil, lying $1\frac{1}{2}$ cables S.W. of the Equerrière, dries 14 feet, and is marked by a pole and basket beacon.

Fisherman Rock, with 8 feet water, lies S. by W. 2 cables from Dasher rock.

The Horn Rock, a mile to the southward of the Ecureuil, is the outer rock of Frouquies de la Grève, dries 16 feet, and is marked by a staff and horizontal cross beacon.

Amongst other rocks of less importance are, Little Seymour rock awash at high water, and marked by a pole and basket beacon, from which a long string of rocks extend out to the eastward, and which may be said to form the southern boundary of Grouville bay at low water. Along this line of rocks are the Grand Haisse, which dries 22 feet, and La Noire dries 14 feet, the latter lying nearly a mile outside Little Seymour beacon.

The Giffard, the outer danger of the long strip of rocks above mentioned, has one foot on it at low water. From Little Seymour beacon it lies E. by N. $\frac{1}{2}$ N. nearly $1\frac{1}{4}$ miles, and W. by S. $\frac{1}{2}$ S., nearly half a mile from the middle of the South Ridge sand at the south end of the Banc du Chateau, on which there is only 12 feet water. From Giffard rock Rozel



mill is a little open west of La Crête guard-house, N. by W. $\frac{3}{4}$ W.; and Little Seymour beacon a little open northward of Gros Etac, W. by S. $\frac{1}{2}$ S.

The other rocks in Grouville bay, off Gorey harbour, of inferior magnitude, although probably not less dangerous, are Azicot rock, which lies nearly one quarter of a mile outside the end of Gorey pier; it dries 5 feet at low water, and is marked by a spar buoy. Les Guillimots, a group of rocks lying S.S.W., one quarter of a mile from Azicot; the outer rock of the group dries 6 feet, and is marked with a spar buoy. Les Burons, a rocky group lying S.S.E. one quarter of a mile from Les Guillimots, the highest rock of which lies to the N.E. and is marked with a spar buoy.

Mooring buoys.—The Inner road buoy is moored in 11 feet water, with Gorey slip just open of the pier head, and Horn beacon in line with Ecureuil beacon.

The Outer road buoy is moored in 32 feet water, with Seymour tower in line with Little Seymour, and fort Henry seen midway between Grouville hill and church.

La Grune Du Port, having 5 feet water, lies outside the Burons, on a line with the end of Gorey pier and Horn rock beacon; and one third of a mile within the latter.

Road Rock, with 9 feet water, lies an eighth of a mile outside La Grune du Port, on a line of direction opposite to No. 2 tower. St. Catherine tower (white), is just shut in with Le Crête point N. by W., and No. 5 tower is in line with the extreme end of the high table-land southward of Grouville mill W. $\frac{1}{2}$ S.

There is a small rock with 26 feet water, lying a quarter of a mile from Road rock, in the direction of Verclut point; within which lies the Inner Road rock, having 16 feet at low water. On this rock St. Catherine tower is just shut in with Le Crête point N. by W., and Gorey pier light-house open north of the Ecureuil beacon, the latter being rather less than one quarter of a mile distant.

A patch of 14 feet lies S. by E. $\frac{3}{4}$ E. about one cable from Road rock.

TRÈS GRUNES lie outside, nearly one quarter of a mile to the eastward of Equerrière rock. They are awash at low water. Little Seymour beacon in line with Seymour tower clears them outside to the eastward by three-quarters of a cable, but passes over another rock with 25 feet at low water; which rock may be considered to be the extreme end of the ledge, for the water is deep to close outside it. Therefore when passing the Très Grunes in a large vessel, open little Seymour beacon perceptibly to the westward of Seymour tower.

North of the Très Grunes, and about $1\frac{1}{4}$ cables from them, lies the Pacquet rock, having 2 feet on it at low water, within which to the

At the same distance are the Anchor rocks, a small group of rocks in low water; the south-eastern of which is marked with a buoy.

BANC du CHATEAU lies off Grouville bay at the seaward end of the low-water line of the shore, and extends from French pier to the mill. Taking the 5-fathom contour line, it is rather more than 2 miles long by one third of a mile wide. The main body of the bank has a general depth of 3 fathoms at low water, over a gravelly bottom; but on the shoreward side are narrow sandy ridges running across the bank in an E. & E. to W.N.W. direction. Near the middle of the bank, for the space of about a mile, these sand ridges lie so close together that they may be considered as one continuous bank; accordingly they have been named the Middle bank. At the lowest spring tides this part occasionally dries.

North Sand Ridge lies rather more than one quarter of a mile within the north end of the Banc du Chateau, and has 10 feet at low water; just to the southward of this, however, there is a smaller ridge with only 5 feet at that period.

South Sand Ridge with 12 feet water, lies along the south-western and southern edge of the bank, close to the deep-water. There can be no doubt that the Banc du Chateau has been formed entirely by the action of the tidal stream, and that the upper part of it is continually shifting, within a particular and limited space. During westerly winds the ridgy apices of the sand-banks on it are so sharp that, when they are awash, a boat may easily knock them down in passing over. At such times the banks are about 4 feet higher than with easterly winds.

This bank is of course a great protection to the anchorage in Gorey roads.

Clearing Marks.—Grouville mill in line with the outer end of Gorey pier W. by S. $\frac{3}{4}$ S. southerly, just clears the 5-fathom contour line at the north extreme of the bank. Icho tower and Little Seymour beacon in line, W. $\frac{3}{4}$ S., leads clear close to its southern end. Coupe guard-house turret in line with the breakwater-house close under Verclut bluff, bearing N. $\frac{3}{4}$ W., clears the north-west corner, and leads down its west side, nearly in mid-channel; and the same Coupe Guard-house turret in line with St. Catherine breakwater-lighthouse, bearing N.N.W. $\frac{1}{4}$ W., will lead eastward of the bank as well as a rocky 5-fathom patch outside.

Tongue Bank are two small shoal spots, lying East from South ridge sand; distant from it nearly one and 2 miles respectively, but separated from Banc du Chateau, and from each other, by good sound channels of deep water. They are of the same character as Chateau bank,



having sharp ridgy apaxes of fine sand. The least water on the eastern bank is 36 feet, and on the western 23 feet.

On the 23-foot ridge Coupe turret appears a little open of St. Catherine breakwater-lighthouse, N.N.W. $\frac{1}{2}$ W.; and Icho tower is open a little northward of Little Seymour beacon W. by S.

Anchorage.—Between the west side of Banc du Chateau and the 5-fathom contour line fronting Grouville bay lies the Outer road, a safe anchorage and sufficiently capacious to accommodate several vessels of large draught, it being a mile long North and South, by nearly half a mile broad. The eastern limit of this anchorage is marked by Coupe guard-house turret being in line with breakwater house at Verclut bluff, N. $\frac{3}{4}$ W. At its western limit St. Catherine tower (white) and Archirondel tower (red) are in line. At its north extreme the end of the pier is seen open south of Equerrière rock and bearing W. by N. $\frac{3}{4}$ N.; and to the southward No. 4 tower and the Horn rock beacon in line marks the boundary. Within the space included by these lines will be found 6 to 8 fathoms at the lowest spring tides, over an even bottom of gravel and shells.

The Inner road lies within the 5-fathom contour line, between the Outer and Inner road rocks, and between the Equerrière beacon and the Burons rocks. In this space are the inner Government moorings, marked by a large buoy in 11 feet at low-water. The ground chain of these moorings lies north and south; there are 38 fathoms of chain on each arm, and anchors of 24 and 30 cwt. A cable within this buoy there are 7 feet, and $3\frac{1}{4}$ fathoms at the same distance outside. The best line to anchor on in the outer road is Grouville church-spire in line with fort Henry, and in the Inner road, Princes tower open to the northward of fort William its apparent breadth.

The anchorage in Gorey roads deserves to be better known than it is, for without any doubt it is the only place in the Channel islands, including also the entire coast of the gulf in which they are situated, to which a squadron of heavy ships might run for shelter in a westerly gale with the certainty of finding it; and the approach is so easy that, with a proper chart and sailing directions, any seaman of ordinary ability should be able to take his ship in without a pilot.

DIRECTIONS for GROUVILLE BAY.—When running for Grouville bay from the northward, and having cleared the Pierres de Lecq and the Drouilles, as well as the dangers lying near the north end of Jersey according to the directions hereafter given, be careful to give Nez du Guet and La Coupe points a berth of at least a quarter of a mile when rounding them, in order to avoid the foul ground which projects from each.

By keeping Belle Hoague bluff in line with Tour de Rosel point, bearing N.W. $\frac{1}{2}$ W., it will lead to the northward of the Pillon rock and danger off Coupe point: and La Roque tower in one with Equerrière rock S.W. $\frac{1}{2}$ S. will lead to the eastward of them.

The North Channel into Gorey road lies between Fara ledge and the north end of Banc du Chateau, and is only one quarter of a mile wide at its narrowest part, with a depth of 6 fathoms at the lowest tides; but it is half a mile wide with 4 fathoms, and therefore perfectly safe with ordinary care, even for the largest ships.

Enter this channel with Grouville mill touching the upper part of Orgueil bluff bearing W. by N. $\frac{1}{4}$ S.: and when Little Seymour beacon comes in line with Seymour tower S.S.W., or the Equerrière rock beacon in line with No. 2 tower bearing S.W. the vessel will be inside the Banc du Chateau, and must haul round to the southward, to bring the stone turret above Coupe guard-house (a ruin) in line with the breakwater-house under Verclut bluff, at the inner part of St. Catherine breakwater, bearing N. $\frac{1}{2}$ W., which is the fairway leading mark inside Banc du Chateau; it is also the eastern limit to the anchorage in the Outer road.

Should it be desired to anchor as near the shore as possible, Coupe guard-house turret may be shut in a little over Verclut point; but Little Seymour beacon should be kept perceptibly open westward of Seymour tower until Gorey tower comes open of the pier end, or until the best anchoring lines given above, are approached. Anchor as convenient according to directions already given.

The South Channel lies between the south end of the Banc du Chateau and the reefs lying north of Petite Anquette without, and between the former and the Giffard rock within; the latter of which is its narrowest part, being here barely half a mile. The water is deep throughout, having not less than 8 fathoms at the lowest tides.

Approaching this channel from the northward, keep Coupe guard-house turret outside St. Catherine breakwater-lighthouse, N.N.W. westerly, until Pinnew tower comes in line with Gorey pier end, to clear a rocky bank outside the Banc du Chateau; after which the Coupe may be brought inside the breakwater lighthouse as far as the outer arches; and when John tower is seen a little open to the southward of Little Seymour beacon, haul in round the south end of the bank.

Rosel windmill over La Crête bluff clears the inside part of South ridge sand, but the leading mark is Gorey church-spire open south of the pier head, marked by a white patch, N.W. $\frac{1}{4}$ N., until Coupe comes in line with the breakwater house under Verclut bluff, N. $\frac{1}{2}$ W., with which run up to the anchorage in the outer road; anchoring as convenient, after passing the line of Horn rock and No. 4 tower, according to



directions already given. Working a large vessel into the Outer road through the south channel, do not open Ichô tower to the southward of Seymour tower until the Coupe comes to the westward of the middle of St. Catherine breakwater, to clear the stony banks, north of Petite Anquette, on which there are 25 feet at low water.

To enter Gorey Harbour.—Keep Grouville church spire on the north side of fort Henry, W. $\frac{3}{4}$ N., until Gorey church spire comes open a little southward of the end of Gorey pier N.W. $\frac{3}{4}$ N.; with which mark run up to the entrance of the harbour.

There are two small warping buoys off the entrance; one situated nearly on the line of the inner part of the pier, distant about a cable from the end; the other within this line, distant only one third of a cable from the pier end. Pass between this inner buoy and the end of the pier, being careful not to approach the latter too close, as the flood tide sets round it to the eastward with great strength. When the Horn rock, of the Frouquies de Grève is awash there will be 10 feet water just off the end of Gorey pier, and 5 feet at the outer berth within it.

Grouville Bay to the South-eastward.—Bring Gorey church spire open of the white patch at the end of Gorey pier, N.W. $\frac{3}{4}$ N., as before, and run out until Ichô tower comes midway between Seymour tower and Little Seymour beacon W. $\frac{1}{4}$ S.; haul out to the eastward on this mark until the Coupe is seen a little open eastward of St. Catherine's breakwater lighthouse, N.N.W. $\frac{1}{4}$ W.; which marks will clear all danger off the Anquettes.

Grouville Bay to the Southward through La Beuf Channel.—After clearing the Anquette north-east patch, as above, steer to the southward, and bring Coupe turret in line with St. Catherine's breakwater lighthouse, N.N.W.; with which mark pass westward of the east Anquette patch, and to the southward. As the line of Ichô and Noirmont towers is approached, Coupe turret may be brought a little inside the lighthouse; and when to the southward of this line, and clear of the Grande Arconie, Coupe turret should be brought within, or to the westward of the lighthouse at least one third the distance to Verclut point, to clear the west side of the Basse Occid des Bœufs, from whence a S.S.W. course will lead down to the channels through the Anquette gravel banks described at page 290, which may always be seen by the tide rippling over them, and easily avoided. When La Moye signal post appears open of Le Fret point, bearing N.W., the gravel banks will be cleared, and a vessel may haul out to the westward.

In passing through this channel it will be useful to remember that Coupe turret touching the outer part of St. Catherine's lighthouse N.N.W. westerly, leads over the Anquette north-east patch, and also over the Basse



From the inside the cross mark for the inner being Biquette house is line with house rock N.W. $\frac{1}{2}$ W.

A small vessel bound from Gorey to the southward may, on the first tide, pass under La Ferrière and the Aquitaine south-east point by keeping by Martin church tower open westward of the white patch on the north side of house (signal) rock about the middle of the patch a point N.W. $\frac{1}{2}$ W.

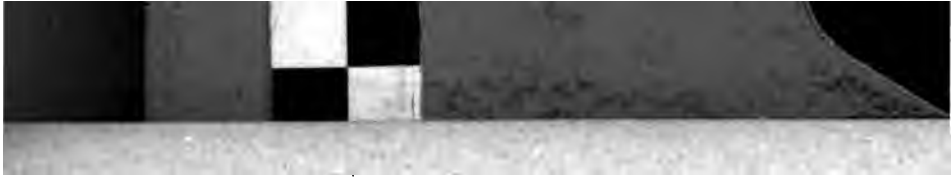
A small vessel may also, at or before mid-tide, pass between François Harbour and the Aquitaine by keeping the Coupe turret in line with the house water-house at Verclut point N. $\frac{1}{2}$ W., until La Moine signal-post appears a little open of La Ferrière point N.W., when she may head out to the southward.

If on approaching La Ferrière channel from the southward the marks on Jersey are indicated, being Mount Haricot, on the French coast, in line with the rocky point of Blairville river E. by S. $\frac{1}{2}$ S.; or Contances cathedral in line with the north end of Blairville village, S.E. by E. $\frac{1}{2}$ E. which may lead up and they can be made out.

It being generally difficult to distinguish the marks for this channel, owing to their great distance, no vessel of heavy draught should attempt to pass through, except in charge of an experienced pilot, and at the upper stages of the tide; nor should square-rigged vessels generally attempt to work through, excepting under such conditions.

Grouville Bay through the Violet Channel.—When leaving the anchorage in Gorey road, bring Gorey church-spire open of the white patch on the pier head N.W. $\frac{1}{2}$ N., and run out until the Gros Etac comes on with the north side of Little Seymour beacon W. by S. $\frac{1}{2}$ S. This position will be abreast of the Giffard rock, where Coupe guard-house turret will be seen a little open eastward of the breakwater-house under Verclut bluff, which is the leading mark to enter the Violet channel with. When approaching the Violet channel be particular that Coupe guard-house turret is only just open eastward of the house at Verclut point. As a check, it will be useful to remember that so long as you can see any part of the white tower in St. Catherine bay open to the eastward of Archirondet tower, you will be quite far enough to the eastward. Another good mark for the middle of the channel when abreast the Petit Four is, Rozel mill touching the north side of Mont Orgueil castle N. by W. $\frac{1}{2}$ W.

When abreast the Petit Four, Karamó rock will appear just shut in with the high land above Noirmont point N.W. by W. $\frac{1}{2}$ W., and Grande Anquette beacon in line with the north side of Petite Anquette rock S.E. by E. From this position steer so as to bring Coupe guardhouse turret in line with Verclut point house, and use it for a leading mark



still; or bring Rousse Platte rock on a S.W. bearing, and steer direct for it until Grande Anquette beacon bears East. In either case proceed due West from Anquette beacon until Icho tower comes in line with Conchière rock, when the Route en Ville will be cleared, and may steer so as to pass about a third of a mile to the southward of Conchière rock; or using the sailing marks given at page 290 in an inverse order to proceed to the westward with.

Anne Port Bay, between Grouville and St. Catherine, is small, and the approach to it dangerous, from outlying rocks; there is, however, good anchorage off it, which is used occasionally by fishing boats and other small craft, in fine weather. The principal dangers off it are:—

The Seven Grunes, a long straggling reef, extending to the eastward from the Gross Moie for the distance of about one third of a mile. The highest of these rocks near the middle of the reef uncovers 7 feet at low water, and the outer Grune has 5 feet over it at that period.

Les Cloches, lying at the distance of one third of a mile from La Crête point, are the southern rocks of the Fara or St. Catherine bank. They dry 5 feet at low water. Between these rocks and the Seven Grunes lies the anchorage off Anne port above referred to, this anchorage although only one quarter of a mile in extent north and south, has an even depth of 5 fathoms over it, and is sheltered from the tide.

ST. CATHERINE BAY, on the eastern shore of Jersey to the northward of mont Orgueil castle, though much contracted by rocks, affords excellent anchorage for small craft in 2 and 3 fathoms water, over a bottom of muddy sand, with very long grass and seaweed; it cannot, however, be entered or left by a sailing vessel but with a leading wind. The bay is completely sheltered from northerly, westerly, and south-westerly winds. South-easterly and easterly winds, however, blow right in, and at such times, near high water, there is a short, turbulent, chopping sea; in proportion as the tide falls, however, the sea subsides.

A harbour of refuge was begun in this bay in the year 1847. The northern breakwater has been carried out 826 yards in a south-easterly direction from Verclut point, the northern extremity of the bay, and over the rocky bed named the Pierre Mouillée, and has a depth of 5 fathoms at its outer end at low water. It was completed in 1855, and forms an admirable pier, with a lofty parapet, alongside of which a steam vessel might coal, water, land or embark troops with ease, in any wind from N.N.E. round westerly to S.W.

The southern breakwater was designed to extend in an E. $\frac{1}{2}$ N. direction from the point near Archirondel tower, and to be carried out over the Basse de Fara. Of this about 200 yards has been built.

This harbour when completed may at no distant period be very useful in bringing Jersey into closer commercial communication with France; but from the great strength of the tides across its entrance, and the dangerous rocks near, it is difficult of access to sailing vessels in bad weather, and therefore fit only for ordinary use of steam vessels.

LIGHT.—A light tower, an octagonal structure of iron, painted white, and 30 feet high from base to vane, stands on the outer extremity of the parapet wall of Verclut pier or breakwater. It exhibits a *fixed* white light, of the fifth order, at 60 feet above the mean level of the sea, and is visible in clear weather from a distance of 10 to 12 miles.

DANGERS off and in ST. CATHERINE BAY.—The approach to St. Catherine bay from the south-east is completely barred by a large bank of rocks about half a mile square, called St. Catherine bank, the outer part of which extends to the eastward of Archirondel tower three-quarters of a mile. These rocks begin to uncover about the last quarter ebb, many show at low water, but by far the greater number never appear at all.

This bank is bounded on the south by Les Cloches, already described; on the east by the Grande Fara, or Le Fara with a pole beacon in the centre, and the Grune du Nord, and within to the north west and north by the Basses de Fara, and the Etot. Of these rocks Le Fara is the largest and most conspicuous, being about half a cable in diameter and dries 9 feet.

Fara Ledge about one third of a mile south-eastward of the Grande Fara is a rocky bank about a cable in diameter, and about the same distance detached from the outer part of St. Catherine bank. The least depth found was 21 feet at low water, but there may be a foot or two less. No. 2 tower and Equerrière beacon in line, S.W., just clears the south-eastern side; and Little Seymour beacon in line with Seymour tower, S.S.W., just touches its western extreme. This latter mark also touches the outer eastern extreme of St. Catherine bank in 28 feet; which same part will be cleared to the north-eastward by bringing Coupe guardhouse in line with, or a little open to the eastward of, the breakwater lighthouse, bearing N.N.W. $\frac{1}{4}$ W.

Eureka Rock, having 12 feet on it at low water, lies off the end of the breakwater, a quarter of a mile from the lighthouse. On the rock the north side of the breakwater is a very little open, and No. 4 tower is just shut in with Orgueil point.

The Pillon Rock has only 4 feet at low water, and lies due north from Eureka rock, distant from it a cable and a quarter, and exactly 2 cables from the end of the breakwater. On the rock, St. Martin church-spire is just shut in with the breakwater lighthouse; and No. 3 tower is just shut in with Orgueil point.



Within St. Catherine bay, on a line between the breakwater lighthouse and Archirondel tower, and nearly 2 cables from the lighthouse is a rock with only 8 feet water ; and another rock with only 7 feet, lying a little to the northward of a line drawn through the breakwater lighthouse and St. Catherine tower, and with Coupe guard-house just showing over Verclut point.

Caution.—During spring tides the stream sets over St. Catherine bank into the bay, also round the end of the breakwater, with great velocity, due allowance for which must be made.

Anchorage.—There is barely room for one large vessel to anchor in St. Catherine bay. The best position is off the middle of the breakwater, distant from it about a cable, or $1\frac{1}{4}$ cables, in 5 fathoms at low water.

Small vessels may lay farther in towards the depth of the bay, with St. Martin church-spire in line with the south extreme of the bluff northward of St. Catherine tower, W. by N. $\frac{1}{4}$ N., and Seymour tower in line with Grosse Moie, S. by W. The depth here is 2 fathoms at low water springs ; at the distance of a cable within this position there is only one fathom and at the same distance off shore, $3\frac{1}{4}$ fathoms. The bottom is a mixture of fine sand and mud throughout.

Directions.—From Grouville to St. Catherine bay, run out of the Inner road off Gorey with Princes tower in line with the north side of, or a little open of, fort William, until Little Seymour beacon is seen just open west of Seymour tower, S.S.W. $\frac{1}{4}$ W., to clear the Tres Grunes and foul round outside of them ; to the northward of which, bring Little Seymour beacon and Seymour tower exactly in line, to pass inside Fara ledge, in 23 feet at low water ; or No. 2 tower a little open south-eastward of Equerrière beacon, S.W., to pass outside Fara ledge.

With Coupe guard-house open a little eastward of St. Catherine breakwater lighthouse, a vessel will be clear of all the rocks of St. Catherine bank, and may steer for the lighthouse, hauling into the harbour when at the distance of a cable from it, and anchoring as convenient, according to the marks already given.

At the distance of a cable south of the breakwater lighthouse, St. Martin church-spire will appear, nearly shut in over the bluff to the northward of St. Catherine tower, which is the best mark to run into the bay with.

There is another passage into this bay, lying to the southward, and within Les Cloches, between them and Le Crête point which, although much encumbered with rocks nearly awash at low water, may occasionally be useful to small craft with pilots. A very useful mark for this small channel during the lower part of the tide is, to bring St. Catherine tower on the east side of Petite Fara rock, to clear the outer rock of the Seven



2. The breakwater is a long, straight structure extending from the shore into the water. It is composed of several sections, each with a different width and height. The breakwater is built on a rocky foundation and is surrounded by a wide area of water. The water is calm and reflects the light from the sky. The breakwater is a prominent feature in the harbor and is used to protect the ships from the waves. The breakwater is a long, straight structure extending from the shore into the water. It is composed of several sections, each with a different width and height. The breakwater is built on a rocky foundation and is surrounded by a wide area of water. The water is calm and reflects the light from the sky. The breakwater is a prominent feature in the harbor and is used to protect the ships from the waves.

Anchorages.—From the northward beyond house in line with the breakwater to the eastward of the breakwater house under Verclun point, the anchorage will lead between the Bayes and Coupe rock; and from the eastward of the breakwater in line with Flipper tower, the anchorage will lead between the Bayes and the Coupe rocks. The best anchorage in Flapier bay, with southerly or south-westerly winds, is in 4 fathoms water midway between the breakwater and the Coupe bank, with Nos. 10, 11, and 12 points in one, N.W. $\frac{1}{2}$ N., and the main tower on the hill to the northward of Mont Orgueil castle in line with the centre of the breakwater, S.W. by S. This anchorage is only a cable north of the Telegraph cable, therefore requires care in taking up. With westerly winds anchor near La Coupe point, about the centre of the



Telegraph Cable, between Jersey and France, lies in a N.W. by W. $\frac{1}{2}$ W. and S.E. by E. $\frac{1}{2}$ E. direction between Fliquet bay, Jersey, and Piron, France. The shore and landing in Jersey is marked by a white martello tower, on which is painted in black letters the word *Telegraph*, surmounted by a green disc.

To prevent damage to the cable by anchors, grapnels, oyster dredges, &c. used by fishermen, the following directions are given :—The course of the cable is distinctly indicated by the two towers, which, during the day, are a sufficient guide for clearing it. Fishing vessels on the coast of Jersey having no compass can avoid the cable to the south by keeping Coupe point in one with Tour de Rozel, and to the north by keeping the guard-house in Bouley bay in one with Tour de Rozel.

ROZEL BAY lies between La Coupe and Nez du Guet points, and being exposed to all winds between S. by E., round easterly, and N.W. by N., vessels never remain at anchor in it longer than to await water into the harbour. In addition to the foul ground off the points of the bay, there is a rocky group called the Hiaux, which uncovers 3 feet at the lowest tides, and lies a cable from the western shore and $1\frac{1}{4}$ cables from the pier head, with Rozel hotel in line with the white patch on the pier-head, W.S.W. There is also a sunken rock with 5 feet water on the eastern side of the entrance to the harbour, a cable from the shore.

HAVRE du ROZEL.—This small but useful harbour, situated at the bottom of Rozel bay, has a stone pier capable of affording shelter to 20 small cutters, such as are employed in the oyster fishery. A great quantity of cider is shipped here during the summer months, and the harbour will afford berthing places to six vessels of from 40 to 50 tons burthen. North-westerly winds cause a great range, so much so that vessels carry away the large hawsers they use to moor alongside the pier. Gorey harbour is preferable in every respect.

The navigation of this harbour is much obstructed by a large flat half-tide rock, lying on the south side of the entrance, not leaving a greater space between it and the pier-head than to allow two small vessels to enter abreast; vessels arriving or leaving with a foul wind are obliged to kedge in or out.

Directions.—Approaching Rozel bay from the northward, and intending to enter the harbour, keep St. Catherine breakwater lighthouse in sight outside Coupe point, until the Royal hotel at Rozel comes in sight to the southward of the white patch on the pier-head, W. by S. $\frac{1}{2}$ S., which mark will lead to the southward of the Hiaux, and to the entrance of the harbour. Give the pier-head a close shave, to avoid the half-tide rock. If the tide should not serve to enter the harbour, the best anchorage



will be found in the north-west side of the bay, with the Royal hotel in line with the white patch on the pier-head, W.S.W., and the lower and the upper part of the wall of Nez du Guet fort in one, or the two chimneys of the guard-house in the fort in one. To keep outside the Hiaux, do not shut the Tour de Rozel in with Nez du Guet.

Tides.—It is high water, full and change, in Rozel bay at 6h. 15m.; springs rise 30 feet, neaps $21\frac{1}{2}$ feet.

Tour du Rozel is a conical mass of rock, 155 feet high, and semi-detached from the point within it, lying about a third of a mile to the westward of Rozel harbour. The top of this rock is generally kept whitewashed, and then forms a most useful mark. There is a half-tide rock lying immediately off it, at the distance of three-quarters of a cable; with this exception the approach is quite safe.

BOULEY BAY, on the northern side of Jersey, between Tour de Rozel and Belle Hogue point, affords good shelter from any wind between W. by N., round southerly, and S.S.E. The only dangers in and near this bay are the rocky patches called the Oyster rocks, the Troupeurs, the Sambues, and a small rock named the Grune de Vicard.

Oyster rocks lie within the Troupeurs, distant $1\frac{1}{2}$ cables from Meulet point, and dry 13 feet at low water.

Troupeurs rocks near the middle of the bay, outside the Oyster rocks, may be described as a small rocky bank, having two heads, lying from each other about N.E. and S.W., distant a third of a cable. The outer head has 10 feet over it, and the inner only 7 feet, at low water springs. On the outer head the inner high rock of the Pierres de Lecq appears a little open of Belle Hogue point N.W. $\frac{1}{4}$ W., and west side of Meulet point is in line with west side of the high cliff immediately above it, S. by W. $\frac{1}{4}$ W. These rocks may be cleared on their south side by keeping the whole of the Pierres de Lecq well open of Belle Hogue point; and on their northern side by shutting the largest rock of the group, near the middle, in behind Belle Hogue point.

The Sambues lie off and to the eastward of Belle Hogue point, distant nearly a quarter of a mile from the shore, and appear soon after half ebb. La Coupe guard-house turret in line with Tour de Rozel point S.E. $\frac{3}{4}$ S., leads clear outside of both the Sambues and Troupeurs.

Grune de Vicard lies nearly a cable from the shore, between the two guard-houses, and has 2 feet over it at low-water springs.

Anchorage.—Outside the Troupeurs, keep the whole of the Pierres de Lecq at least a point open of Belle Hogue point to the westward, or Coupe open of Tour de Rozel to the eastward; and the white tower of Castle house, situated on the high land overlooking the bay, in line with Bouley



pier, S.W., in 8 to 10 fathoms, gravel. Or further in, with the white tower of Castle house open of the pier, bearing S.W. by W.; and Belle Hougue point a little open of Vicard point, N.W. $\frac{1}{2}$ E., in 5 fathoms, fine sand.

This is a safe anchorage in southerly winds, but open to those from the northward. Vessels anchored in this bay during S.W. gales should therefore be prepared to weigh directly the wind begins to veer to the N.W., and proceed either to St. Catherine's bay or Gorey road.

BELLE HOUQUE POINT, lying about a mile to the westward of Bouley bay, is the highest and—excepting Grosnez—most remarkable bluff on the north coast of Jersey. A reef of sunken rocks extends from it to the distance of 2 cables off shore. This reef is cleared on its north-east side by keeping Coupe turret a little open of Tour de Rozel, and on its north by keeping Plemont point in sight outside Ronez point.

Giffard and Bonne Nuit Bays lie close to the westward of Belle Hougue point, between it and Fremont point, the latter being a high bluff. La Crête point divides these points from each other. Giffard bay is small, but the ground is clean.

Bonne Nuit bay, lying westward of Giffard bay, may be easily recognized on nearing it by St. John's barracks, a long range of low buildings near the middle of it: also by Mont Mado mill, which stands on the high land above them. Near the middle of the bay, about 2 cables from the shore, there is a large black rock, which only covers at great spring tides, named Cheval, and several sunken rocks half a cable outside it. A mass of partly sunken reef extend from Fremont point out to the northward for one quarter of a mile, the outer extreme of which is marked by a rock drying 16 feet at low water, named Demie.

Anchorage.—The best berth lies about one-quarter of a mile northward of La Crête point, in 7 to 9 fathoms, sand. A vessel will be here very well sheltered from southerly and westerly winds, but she must be prepared to slip in case of a sudden shift to the northward.

Shamrock bank, North from Fremont point, nearly three-quarters of a mile, is a sunken rock 400 yards in diameter. The least water found, 9 feet, lies on the inner part of the bank, and with 7 and 8 fathoms close around. On the 9-foot rock Plemont hotel is seen just within the outer part of Ronez point, W. by N. $\frac{1}{4}$ N., the western house of St. John's barrack is a little open of Fremont point, S. $\frac{3}{4}$ E., and Tour de Rozel over the outer extreme of Belle Hougue point; these marks may be used for passing either side of the bank.

St. John's Bay, situated between Fremont and Ronez point, is but a slight indentation of the coast, and can scarcely be called a bay; its shore is, moreover, so fringed with reef as to be almost inaccessible; there are



also outlying rocks extending nearly 2 cables from the shore, between which and the Shamrock bank, however, is a passage nearly half a mile wide.

Strangers are advised not to attempt passing through this channel without a pilot, nor to approach the coast hereabout nearer than a mile.

This part of the coast is remarkable from the extensive granite quarries which add to its naturally barren and wild appearance.

Ronez, Sorel and Plemont Points, unlike Bell Hougue and Grosnez points, are all low at their outer extremes, but rise within at rather steep inclines, uniting with the high level plateau, which distinguishes the north coast of the island, at distances but little more than a quarter of a mile.

Ronez and Sorel points are steep-to, but between them, at the distance of half a cable outside the chord of the bay, there is a sunken rock with only 3 feet water, called Grune de Vieq, which may be cleared on its north side by keeping Lipendi point open of Ronez point, until La Plaine point is seen open of Sorel point.

LA PLAINE POINT has a reef extending from it to the distance of half a cable at low water ; outside of which, however, it is steep-to.

From La Plaine point to Grève de Lecq, the coast is cliffy, precipitous, and dangerous of approach, having outlying reefs and sunken rocks extending more than one quarter of a mile from the shore.

GRÈVE DE LECQ BAY lies in the depth of the bight between Sorel and Plemont points: its position may be recognized at a distance by a whitewashed martello tower, standing near the middle of a high sandy beach.

The anchorage off Grève de Lecq is good and safe in all winds, excepting those from the northward; the best position being in 9 to 6 fathoms sand, with Grève de Lecq tower from S. by W. to S.S.W. $\frac{1}{2}$ W., distant from it half to a third of a mile; at the latter position Plemont point will be a little open of the Grand Becquet. The dangers in and near Grève de Lecq are—

Los Domios, the highest of which dries 16 feet, lie off the eastern bluff of the bay, a quarter of a mile from the shore, and N.E. by N. 4 cables from the white martello tower.

Grune do Becquet, having 21 feet water, lies N.E. $\frac{1}{4}$ E., nearly three-quarters of a mile from Grand Becquet head. On the rock Grosnez bluff appears a little within the low point of Plemont W. by N., and Grève de Lecq tower S. by W.

Grune de Douet, with 12 feet over it, lies a third of a mile within Grune de Becquet, and E. $\frac{1}{2}$ N., one quarter of a mile from Becquet head.

GRÈVE AU LANCON between Plemont and Grosnez points is a small but remarkable bay, from its fine level white sandy beach; which,



however, unlike Grève de Lecq, is all covered by the tide long before high water; at which period the sea rolls into the numerous caverns of the cliffs bounding the bay, cutting off all communication with the high land above, and imparting a wild aspect to the coast.

The dangers here are, a rock that dries 14 feet at low water on the west side of the bay, lying a cable from the shore; and the reef which dries at low water, extending a cable from Plemont point.

The best position for anchorage is off the middle of the bay, with Grosnez bluff bearing about West, in 9 to 6 fathoms, sand.

Small vessels bound round Grosnez point to the southward, between the periods of half flood and half ebb, and unable, in light winds, to stem the northern tide, may advantageously anchor in this bay till half ebb, when the southern tide will have made and favour their proceedings through the swatch-way; or, if they are bound to the eastward, between the Pierres de Lecq and the island, and having anchored on the ebb, can weigh at low water, and carry a fair tide as far as La Coupe.

Caution.—The holding ground is not good, and a sailing vessel approaching or leaving the bay must be prepared for unsteady flaws of wind from the high land, and varying eddies of tide.

Of course no sailing vessel would anchor in any of the bays along the north shore of Jersey in northerly winds, but should any be so caught at anchor by an unexpected shift of wind, it may be advisable not to weigh before the weather tide makes to ensure getting out.

ECREHOS ROCKS about midway between the north-eastern coast of Jersey, and cape Carteret, are separated from another rocky group to the westward, called the Drouilles, and from the Ecrevière banks to the eastward, by very narrow and shallow channels.

The whole of these reefs and banks together occupy an elevated plateau of shoal water, 9 miles long in a N.W. by W. and S.E. by E. direction, and 2 miles wide. This line of reefs and banks affords considerable protection to the north coast of Jersey, as well as to the fine broad and deep channel lying between, named Le Ruau.

The main group of the Ecrehos rocks occupy a space near the centre of the reef, about three-quarters of a mile North and South and half a mile wide, the whole of which space dries before low water. Maître isle, the largest of the group, marks the southern extreme of this reef to the eastward; and along its steep eastern side to the northward lie the rocky islets named Marmotier, Blanc isles, Tas de Pois, and La Vielle; the two latter being conical shaped rocks 50 and 54 feet high respectively.

The western side of the reef is marked to the southward by the high rocks called Les Côtes and Colombier; and to the northward by Grosse



1. The first step in the process of identifying a problem is to recognize that a problem exists. This involves gathering information about the situation and identifying the specific issue that needs to be addressed.

[illegible]

The following information was obtained during the summer season for the purpose of determining the extent of the problem:

Marine Cove is a small cove on the south shore of the strait of Jersey, the eastern part of the island of Jersey, formed by a point terminated by a lighthouse, and having a sandy beach. It is the best landing place on the highest part of the island near the mill, and makes a convenient and useful harbor.

Along the eastern shore of the flat reef of the Enderby above described, but separated from it by a narrow channel, lies a steeply rising mass of reef; narrow at one extremity and broad at the other, but enlarging and increasing its width as one approaches it, and extends steadily on a convex line, to almost directly N. from the station at which we were lying a mile distant. Here the rocks suddenly terminate, and a bank of gravel and sand commences, extending to the N. and N. W.

Of the above described fish, only those used for sailing marks, viz., Bignone, Salmonella, and Grand Galle, need special notice.

Bigorne, a very remarkable horned rock, 25 feet above high water, lies nearly half a mile eastward of Maître Isle. Sablonière and Grand Galère, lying a little to the north-east of Bigorne, are less elevated than it, although never covered by the tide. Bigorne, midway between Sablonière and Grand Galère, leads through the middle of the western channel into the Maître Isle anchorage.

Ecrevière Rock, the south-easternmost of the Ecrehos group covers 8 feet at high-water springs, and lies E. by S. three-quarters of a mile from Maître Isle. From this rock to the southward extends the—

Banc de l'Ecrevière, the south extreme of which, taking the 5-fathom contour line as a boundary, lies S. by E., nearly 2 miles from the rock. Its greatest breadth, near the north end, is half a mile; tapering off to less than a quarter of one mile at its south extreme.

The bank is very steep along its western side; its apex consists of a number of semi-detached fine gravel and sandy ridges, convex to the south-westward, lying nearly parallel to each other, drying from 3 to 5 feet

at low water, and separated only by small narrow channels of 3 to 8 feet in depth.

The stream setting over this bank cause a confused sea in bad weather. Bigorne rock, and Tas de Pois in line marks the direction of the south extreme of the bank, and by opening these objects of each other a point either way the end of the bank may be rounded as necessary.

Grouville mill, in line with Orgueil bluff, passes over the bank, a quarter of a mile within its south extreme, awash at low water. Therefore, to clear the south end of the bank open Grouville mill a little, to the southward of Orgueil bluff, bearing W. by S. ; or bring Rozel mill in line with, or a little open southward of Coupe turret W. $\frac{3}{4}$ N.

Ronde Selhere, the southernmost of the Ecrehos rocks, uncovers 7 feet at low water ; on it Marmotier islet appears on the right high or eastern extreme of Maître isle ; and St. Martin's church spire is a little open north of Fliquet tower W. by S.

There is another rock of similar character and appearance, but drying 8 feet at low water, lying a sixth of a mile to the N.W. of this ; and a third named Petite Noire, drying 12 feet at low water, which lies to the northward about the same distance ; the three rocks thus forming an equilateral triangle.

There is also a reef, awash at low water, lying a cable to the eastward of Ronde Selhere.

These rocks may be cleared on their S.W. side by just shutting Plemont point in behind Ronez point. St. Martin's church spire in line with Fliquet tower W. $\frac{3}{4}$ S. leads clear to the southward. Tas de Pois on with the east side of Marmotier N. by W., leads between Ronde Selhere and Ecrevière bank. To keep clear outside of Grande Noir rocks, the whole of Petite Rousse rocks must be well open of the high rocks off Maître isle. Bigorne rock, midway between Sablonière, and Grande Galere, N.E. $\frac{1}{4}$ N., clears Ronde Selhere rocks on their west side.

ANCHORAGE is to be had south of Maître isle and within Ronde Selhere for small vessels only. The best position is with Marmotier houses just open on the east side of Maître isle, North ; and Bigorne midway between Grand Galere and Sablonière N.E., in 5 fathoms, gravel.

Large vessels wishing to anchor here should keep outside the line of Ronde Selhere rocks and Ecrevière bank ; anchoring on the leading line already given. Tas de Pois on the east extreme of Marmotier in 8 fathoms, gravel.

Nipple rock may be said to form the outer or western corner of the western entrance to the inner anchorage off Maître isle, the rock near its centre dries 16 feet at low water ; at this spot the Grande Galere is open of the south extreme of Maître isle, N. by E. $\frac{1}{4}$ E., and Grosse Tête a

little open West of Colombier N. $\frac{1}{4}$ E. A rock named the *Vraic*, which dries 5 feet, lies S.E. by E. $\frac{3}{4}$ E. 3 cables distant from the Nipple rock. Sablonière and Bigorne rocks in line lead over this danger.

Les Demies are two rocks scarcely a cable apart, whose apexes are exactly at half-tide level; they lie half a mile north from Nipple rock, and about the same distance westward of the Ecrehos main reef.

On the outward Demie, Marmotier appears just open southward of Les Cotes rocks E.N.E.; La Vielle a little open west of Colombier N.E. $\frac{1}{4}$ N., and St. Martin's church spire over the Coupe W.S.W.

Rouquet reef consists of several detached clumps of sunken rocks lying on the north side of the Ecrehos, but separated therefrom by narrow channels of deep water. The highest rock of the eastern clump is awash at low water, and lies with St. Catherine's lighthouse midway between the tower north of Mont Orgueil and the end of the Plateau above Gorey S. W. $\frac{1}{4}$ S., and Maître isle beacon midway between Gross Tête and La Vielle S.S.E. $\frac{1}{4}$ E.

Petite Rousse rock has three heads, elevated 12 to 14 feet above high water, and lies on the north-west side of the Ecrehos reef, distant from it three-fourths of a mile; the whole of which space, excepting a narrow and tortuous channel, is filled up with rocks, a great number of which uncover every tide. There is also a clump of dangerous rocks awash at low water, lying S.S.W. half a mile from Petite Rousse.

Grande Rousse rock is elevated 22 feet above high water, and lies rather more than half a mile N.W. from Petite Rousse. Like the latter it is surrounded by dangerous reefs.

Tides.—It is high water, full and change, at the Ecrehos rocks at 6h. 32m., springs rise 31 feet, neaps 22 $\frac{1}{2}$ feet.

The DROUILLES.—This rocky group lies about 3 miles westward of the Ecrehos, and nearly 4 miles to the northward of La Coupe point. It is about 1 $\frac{1}{2}$ miles in diameter, and consists of broken detached masses of reef, the whole of which covers with the tide, excepting only three small rocks near the south-west side, the two largest of which,—

The Burons are of conical form, about the same height, 7 feet above high water, lying only a few fathoms apart. Although so small, they are most useful marks to vessels navigating Le Ruau channel, and should therefore be made more conspicuous by building a beacon on the outer or larger rock of the two. Outside the Burons there is another large rock called Frouquie, which is 8 feet lower than them, being just awash at high water.

Joli is a small pinnacle rock, drying 6 feet at low water, and lying W.S.W., distant nearly three-quarters of a mile from the great Buron. On the rock, Maître isle beacon is on the middle of Les Cotes rock S.E. by E. $\frac{3}{4}$ E., and Rozel mill is open eastward of La Tour de Rozel S.S.W.

La Hau is a sunken rock with 12 feet water, lying outside or to the southward of Joli, from which it bears S.S.W. $\frac{3}{4}$ W. rather more than one third of a mile. This rock forms the northern boundary of Le Ruau channel at its narrowest part.

Platte rock is one of the largest of the Drouilles group, and marks their southern boundary to the eastward as well as the western side of the entrance to L'Etoc channel, to the southward. It dries 33 feet at low water equinoctial springs.

On the rock Rozel mill is in line with the fort on Nez du Guet, bearing S.W. $\frac{1}{2}$ S., and the Great Buron N.W. $\frac{1}{4}$ W. three-quarters of a mile.

Among the less important rocks of the Drouilles group are La Grese, which lies North nearly half a mile from the Platte, and uncovers 29 feet at low water; Noire Roque lies N.E. by E. one quarter of a mile from great Buron, and dries 35 feet; Clump rock, marking the northern visible extreme of the group, dries 15 feet. The Grunes are an extensive bed of rocks, visible only near low water, lying half a mile westward of Clump rock.

La Kosem, the northernmost sunken rock of the group, has 12 feet over it at low water.

Le But, with only 8 feet on it at low water, is the western head of a group of rocks, several of which uncover 4 to 6 feet. It lies W. $\frac{1}{2}$ N. a little more than three-quarters of a mile from the Great Buron. There is another rock with 21 feet water over it W. by N. $\frac{1}{2}$ N. $1\frac{1}{4}$ cables from Le But; this forms the western danger of the Drouilles.

Directions.—Verclut point, shut in by La Coupe, leads westward of the Drouilles; but a better mark is Rozel mill well open westward of the Tour de Rozel, S. by W. Maître isle beacon open a little to the N.E. of Grosse Tête S.E. $\frac{1}{4}$ S. clears their north extreme. Seymour house and Verclut point in line S.S.W. $\frac{1}{4}$ W. clears their eastern side, and leads through the Passe de L'Etoc. La Vielle and Grande Rousse rocks in line E. $\frac{3}{4}$ S. will lead to the southward.

LE RUAU CHANNEL, between the Drouilles rocks and Jersey, is at its narrowest part $2\frac{1}{2}$ miles wide, very deep, and free from danger at all times of the tide, although the confused sea occasionally thrown up by a strong weather tide running over the rocky uneven bottom is so violent as to resemble breakers.

The northern entrance to Le Ruau, between the Drouilles and Pierres de Lecq, is 5 miles wide, and free from danger; the approach to Le Ruau from the westward, between Pierres de Lecq and Jersey, is also roomy and safe; and any seaman of ordinary ability, having a good chart, should be able to sail his vessel into the outer road off Gorey without a pilot.

Pass de L'Etoc is formed between the east side of the Drouilles group to the westward and the Grand Rousse, L'Etoc, and Fierco rocks, besides Grune du N.W., Grune du S.W., and many others to the eastward. The narrowest part of the channel lies between the Platte rock and Grune du S.W., where it is but little over one quarter of a mile wide.

Grune du S.W. lies on the east side of the southern entrance of the Passe de L'Etoc, S. by E. half a mile from the Platte rock, and has 5 feet over it at low water. From the rock Seymour house appears a little open of the breakwater-house under Verclut point S.S.W. $\frac{1}{2}$ W., and Maître isle beacon in line with the south side of Les Cotes rock E.S.E. southerly.

L'Etoc.—This rock, in the form of a saddle, uncovers 16 feet at low water, and lies on the eastern side of Passe de L'Etoc; E. $\frac{1}{2}$ N. nearly a mile from the Platte rock, and N.E. $\frac{3}{4}$ E., a mile from Grune du S.W. The marks for it are, the highest heads of Pierres de Lecq in line with the northern head of the Burons, W. by N. $\frac{1}{2}$ N., and the martello tower northward of Mont Orgueil on with the middle of St. Catherine's breakwater S.S.W. $\frac{3}{4}$ W.

Le Fierco stands near the middle of a reef of rocks, most of which never uncover, one quarter of a mile in extent North and South, and lies E.N.E., 3 cables from L'Etoc, and uncovers 7 feet at low water.

Grune du N.W., having 7 feet water, is the shoalest rock of the northernmost reef on the east side of the Passe de L'Etoc. It lies N.E. $\frac{1}{2}$ E., $1\frac{1}{4}$ miles from the Platte rock, and N. by E., nearly three-fourths of a mile from L'Etoc, with Rozel mill its length open eastward of the fort on Nez du Guet point S.W., and Grosse Tête rock touching the south end of Maître isle S.E. $\frac{3}{4}$ S.

Directions.—The best mark to run through the Passe de L'Etoc is Seymour house in line with Verclut point S.S.W. $\frac{1}{4}$ W.; but when passing abreast of Grune du S.W. (marks for which are given above) should the tide be low, Seymour house may be brought a little within or to the westward of Verclut point, provided the leading line be regained immediately afterwards, to avoid passing too near the Platte. The same may be done also to give a good berth to a sunken rock with 7 feet water, which lies on a line with Tas de Pois and L'Etoc rock.

The Passe de L'Etoc has a general depth of 8 fathoms in it, and the bottom, although very rocky, is tolerably regular; the tides, however, both ebb and flood, set across it for a considerable period; no stranger should therefore attempt to pass through without a pilot.

There is a 5-fathom channel between the Grande and Petite Rousse rocks; it is, however, in some places but little more than a cable wide, besides being tortuous and studded with rocks.

Above half tide, a vessel under 12 feet draught could, with a leading wind, safely pass through by bringing the martello tower on the hill northward of Orgueil castle in line with the lighthouse at the end of St. Catherine's breakwater, S.W. $\frac{1}{2}$ S.; but below half tide the channel is dangerous to navigate, even for boats.

Bearings and Distances.

		Miles.
Corbière to Roches Douvres lighthouse	W. $\frac{3}{4}$ N.	22 $\frac{1}{4}$
„ Hanois lighthouse	N.N.W. $\frac{3}{4}$ W.	23 $\frac{1}{4}$
„ St. Martin's Point	N. by W. $\frac{1}{2}$ W.	18 $\frac{1}{4}$
„ Western rock of Rigdon bank	N. $\frac{3}{4}$ W.	3 $\frac{3}{4}$
„ L'Etac d'Serk	North	14 $\frac{1}{8}$
„ N.W. Danger rock, Minquiers (Brisant du Nord Ouest).	S.S.W. $\frac{3}{4}$ W.	11 $\frac{1}{2}$
„ Outer Danger south of Hubaut rock.	S.S.E.	2 $\frac{7}{8}$
„ Icho Bank	S.E. $\frac{1}{4}$ S.	7 $\frac{2}{3}$
„ Frouquie Aubert	S.E. $\frac{1}{2}$ E.	11 $\frac{1}{4}$

GENERAL DIRECTIONS.—It cannot be too deeply impressed on the mind of the mariner, when approaching the Channel islands at night, in thick hazy weather, or when navigating amongst them under such circumstances, the necessity for taking regular and careful soundings; for although the islands and rocky reefs generally are steep-to, so that the lead may give little or no warning of their near neighbourhood, yet it is possible for a vessel to be set inside the boundaries of the sunken part of some of these dangers without seeing them; where a knowledge of the depth afforded by the lead might enable her to anchor, and thus save her from wreck.

Moreover, there are extensive banks of gravel and sand amongst the islands, as well as other occasional irregularities in the bottom, which the careful pilot would know how to turn to account in estimating his position. Again, there is the French coast within the islands, where the soundings are generally so regular that the lead may be taken as a safe guide in estimating distances from the shore.

Whenever the lead is hove it may be assumed there is some degree of uncertainty about the position of the vessel. On such occasions, therefore, the lead should be kept on the ground for a minute or two, and the setting and drift of the stream noted. For as the tidal streams varies considerably in strength and direction according to position, and diagrams containing precise information on this subject are engraved on the chart, a comparison of the two might occasionally be found very useful.

When the stream runs strong, tide ripples and overfalls always make their appearance over sunken rocks, or banks lying out in the channels, or other exposed places; in foggy weather, therefore, they may be turned to good account by the pilot. An anchor should always be in readiness, when navigating any of the channels between the islands, in thick weather; but before letting go always turn the vessel's head against the tide, if possible; otherwise, the chances would be very much in favour of snapping the cable.

By Night, from the Northward.—Having made cape La Hague light, enter the Race of Alderney as near mid-channel as possible, and thence steer S. by W. or S.W. by S., according to the tide. Should the weather be clear, the position of the ship may be ascertained, and the course regulated by the coast lights with accuracy. If the lights are obscured, Serk should be sighted, or the ship should be anchored, as convenient, remembering that a moderate depth and good anchorage may be secured by hauling in a little towards the coast.*

Should there be too much swell to anchor, any position desired may be maintained by means of the lights; or in hazy weather, by a near approach to Serk, which is very steep-to and safe of approach, excepting on a south-easterly bearing, the direction of the Blanchard rock. At the upper stage of the tide bring the middle of Serk to bear S.W., and on its lower stage N.N.E.; in calm weather the drift will then be away from the island.

From the middle of the Race towards the east coast of Jersey, through the Drouilles channel, steer on the above-mentioned courses until cape Carteret light bears E. by S. St. Catherine's light will now be seen, and by keeping it open and shut with Coupe point S. by E. $\frac{3}{4}$ E., will pass nearly midway between the Drouilles and Belle Hougue point. When inside the Drouilles, open the light of Coupe point, and do not approach Jersey nearer than a mile; after passing the light bring it to bear N.N.W. $\frac{1}{2}$ W., from one to $1\frac{1}{2}$ miles, and anchor in 9 fathoms until daylight.

Should St. Catherine light not be seen when cape Carteret light bears E. by S., proceed with caution; bearing in mind that from the northernmost of the Pierres de Lecq, cape Carteret light bears E. $\frac{1}{3}$ S., and that a line drawn from one to the other of those objects clears the north extreme of the Drouilles reef by a mile. The Drouilles are all so low that they would hardly be seen at night until a vessel was amongst them; but as they are faced to the northward by a fringe of sunken reef or bank, the lead might possibly give warning of their neighbourhood.

* In easterly winds there is good anchorage in Vauville bay, to the southward of cape La Hague, and along the coast to nearly abreast of cape Carteret, 3 to 4 miles from the land in 12 to 14 fathoms.

The Pierres de Lecq are steep-to on the east side and some part of the rocks always visible; they are therefore much safer to approach at night than the Drouilles. Of course none of these or any other dangers should be approached under circumstances of difficulty with the tide. Grosnez bluff bearing W. by S. just clears the inner or south extreme of the Pierres de Lecq reef.

If bound through Deroute channel, round the west coast of Jersey for St. Helier, from the middle of the Race steer S. by W., or S.W. by S. as before, until cape Carteret light bears S.E. by E. $\frac{1}{2}$ E., or E.S.E., to clear Blanchard rock off Serk; after which haul out about W.S.W. into the Deroute channel clear of Pierres de Lecq, and continue on the same course until the white light on the Corbière rock comes in sight S. by E. $\frac{1}{2}$ E., a S. by W. course may then be steered until abreast the Corbière rock, to the westward of which, at the distance of 2 or 3 miles, a vessel may heave-to, and wait for daylight, or for a pilot.

In thick weather do not approach the Corbière nearer than 17 or 18 fathoms, and lay the vessel's head N.W. by N., during the whole of the flood, as the stream sets very strongly down towards the Minquiers reef, and many vessels have been wrecked there through neglecting this precaution.

Should there not be too much swell a vessel could anchor for a time on the great bank, in 5 to 8 fathoms, N.W. by W. $1\frac{1}{2}$ miles from Corbière rock, or between this position and No. 4 tower in St. Ouen's bay, where the water would be smoother and the tide not so strong.

From the North-west.—From St. Peter Port, Guernsey, steer so as to sight the white light on the Corbière rock on a S. by E. $\frac{1}{2}$ E. bearing, which on a clear night will be done shortly after passing St. Martin's point, take care not to lose sight of the light, and when Grosnez point bears E.S.E., if it be desired to pass outside West rock, on which there are 6 fathoms, steer S.W. by S. until past that danger, after which proceed as before directed until daylight. A steam vessel of light draught, in charge of an experienced pilot, might in a fine clear night, and during the upper stage of the tide, safely proceed on into St. Heliers harbour; in which case she should approach the Corbière on the above direct course until within $2\frac{1}{2}$ or 2 miles of it, then endeavour to make good a S.S.W. course, until the rock bears East, after which steer direct for Noirmont point, which should be approached within a quarter of a mile, and thence steer out a little to ensure clearing Pignonet rock; then E. by S. for the entrance of the small road; keeping a look out for the two lights on Albert pier, and when they come in line keep them so up to the entrance of the harbour.

From the Westward.—Endeavour to make either the Hanois light at Guernsey or that on the Roches Douvres, and fix the position of the ship accurately by bearings, before shaping a course for the Corbière rock or Grosnez point; according as desired to proceed to the southern or northern coasts of the island. Should a vessel pass inside the line of the above lights without seeing them during foggy weather, the lead ought to be frequently hove until the Corbière rock light is seen and the position ascertained beyond doubt. On the meridian of the Hanois, 34 fathoms will be obtained, shoaling to 32 and 30 fathoms along the Deroute channel as far as Serk, whilst to the southward of a line drawn from Roches Douvres to Grosnez point the depths will vary between 26 and 23 fathoms.

From the South-west.—Do not approach the reefs fronting St. Aubin bay into a less depth than 10 or 12 fathoms, and should this depth be obtained, anchor if practicable, and wait for daylight.

LIGHT.—On the Plateau des Roches Douvres is an iron lighthouse, painted white, which exhibits at 180 feet above the sea a white light, showing a *flash* every *five seconds* and visible in clear weather from a distance of 21 miles.

Fog Signal.—During foggy weather a bell is sounded at intervals of three seconds.

Tides.—Along the northern and southern shores of the island, between Grosnez point and Belle Houge point, and between Seymour tower and Corbière rock, the whole of the flood runs to the eastward and the ebb to the westward, each 6 hours, and according to the trend of the land; the velocity of the springs being about 4 knots, and of neaps about 2 knots.

In Grouville, St. Catherine and St. Ouen bays, the stream, between half flood and half ebb, runs to the northward, and in a contrary direction between half ebb and half flood, with a velocity in each of $4\frac{1}{2}$ knots at springs, and $2\frac{1}{2}$ knots at neaps; the streams will consequently meet at the four principal extremes of the island, viz., La Coupe point, Grosnez point, la Corbière point, and the Conchière rock.

The rotary motion of the tidal stream round Jersey being the governing cause of the various sets close to its shores, some description of its action is necessary. Commencing therefore at the period of high water, and in a position about 4 miles S.W. of St. Helier, the stream which has been setting S.E. and East, quickly alters its direction to N.E.; which a glance at the chart will show is full on to the south coast of the island, making the space included between the above position and the land what pilots call the crown of the tide, causing slack water as the shore is approached.

The north side of the island lying in the lee or eddy, there is slack tide there also, but along the east and west coast of the island the tide is setting to the northward at its full strength. At half ebb the offing stream has veered round from North to N.W. and S.W.; the crown of the tide is now on the east side of Jersey, and the west side is on the lee or eddy, making slack water therefore at this period in Grouville and St. Ouen bays; the stream running at its full strength along the north and south coasts of the island. At low water the tidal stream is setting from a northerly direction on to the north shore of Jersey, making the crown of the tide on that side, and the lee to the southward of the island; at half flood the crown of the tide being on the west coast of the island with precisely similar results.

A careful consideration of this revolving motion of the tidal stream will serve to explain all the peculiar sets of the tides met with in the bays round the island. Thus at Noirmont point near half flood, when the east going stream attains its full strength, there is an outset from St. Aubin bay, which runs with considerable strength between Point de Bût and the Pignomet rocks, and which is sensibly felt within the bay as far as St. Aubin castle; this is at first a mere eddy of the flood stream, originating under Noirmont point; but as, after half flood, the stream shifts from east to the north-eastward, and sets right on the Hermitage rocks and Elizabeth castle, the very gentle incline of the sandy shore here and the great space to be covered causes the level of the sea at this part of the bay to be considerably elevated above that of the western side of the bay, and the water of course runs off in the direction of the lower level.

On referring to the chart, it will be seen that the peculiar configuration of the bay tends materially to turn off the stream from the north-east to a northerly direction; it will not therefore be difficult to understand that the small eddy under Noirmont point being united with the westerly flow round the head of the bay, causes the continuous outset from Noirmont point above mentioned; this outset runs for 9 hours, viz., from half flood to high water and during the whole of the ebb; it attains its greatest strength about an hour after high water, and at this period during a westerly gale and spring tides throws up a dangerous breaking sea or race off Noirmont point.

From causes similar to those explained above, viz., the offing stream shifting and impinging on the land, the tide sets across the harbour's mouth at St. Helier to the northward as well as into the harbour, during the whole of the flood, and out or to the southward on the ebb; except near the bridge inside Elizabeth castle, where the tide sets north-westerly from last quarter flood until the bridge is awash at one foot under half tide.

Out in the offing to the south-westward, clear of the island, the strength of the tidal stream, both ebb and flood, is found to run in a N.W. and S.E. direction, remaining longer near those points than any other ; and it has been already shown, that near high water it quickly changes its course to East and North-east, at this latter point running full on the island and making high water there. It does not stay any time on this point, however, but it continues to veer round by the north until it attains a north-westerly direction, where its shifting movement is much slower ; the strength of this north-westerly stream is felt at half ebb on the south coast of Jersey. To arrive at a right understanding of the force and effect of the ocean swell along the south coast of Jersey in westerly gales it will be necessary to follow this changing direction of the offing stream.

An hour before high water, on the slacking of the south-easterly stream in the offing, the westerly stream sets round Noirmont point, and to the westward of it ; checking the advancing westerly swell during gales from that quarter, and causing it to break heavily. As this natural break-water forms at Noirmont point and its outlying reefs, the water within and to leeward, both in St. Aubin bay and the road of St. Helier, becomes smoother, and as the westerly, or ebb stream increases in strength so does the swell continue to decrease within. After the tide has fallen below half ebb, the outlying reefs gradually uncovering with the tide, assist materially in blocking the swell out, but after low water the offing stream changes ; the westerly swell rolls in again with the southerly stream increasing in force with the rising flood, until again checked as before by the slacking of the offing stream and the making of the westerly stream in shore.

CHAPTER VIII.

CAPE DE LA HAGUE TO GRANVILLE, INCLUDING ILES CHAUSEY
AND PLATEAU DES MINQUIERS.

VARIATION IN 1882.

Cape de la Hague	-	-	-	18° 50' W.
Iles Chausey	-	-	-	18° 20' W.

CAPE de la Hague, the Nez-de-Jobourg, Goury harbour, the dangers in the vicinity, and the directions for avoiding them, have been given in pages 5 to 7. The dangerous rocks off the cape, both to the westward and to the northward, and the breakers, which may be discerned almost a mile from the shore, render it prudent for a stranger never to shut in Rosel point with cape Flamanville, unless the Ortach rock, or the Casquets, are open to the northward of Alderney, particularly during the north-eastern stream and a westerly wind. The best plan is to endeavour to keep as near as possible in the middle of the Race of Alderney. With easterly winds cape Carteret guard-house may be substituted for Rosel point, if clear of the Trepieds or Huquets de Jobourg.*

From Nez-de-Jobourg a precipitous coast, formed by cliffs of equal height, extends S.E. 4 miles as far as the sandy beach bordering Vauville bay. These cliffs are intersected by narrow and deep valleys, and their bases are bordered by rocks, which in some places extend 3 cables into the offing. The tops of the hills adjoining the coast are at about the same elevation as the Nez, and they unite by a gentle rise with the highest land, upon which, at 1½ miles E. by S. of the Nez, stands Jobourg church.

The Nez-de-Jobourg is surrounded by a sort of rocky barrier, which extends out a mile in a north-west direction from the Nez, and terminates in the westernmost of two rocky flats, named Basses de la Dossière, upon which there are only 9 feet at low water. The Dossière rock lies 4 cables to the northward of the Nez, and uncovers 16 feet. It is the highest rock of the barrier, and the local pilot make use of it as a half-tide rock, as it covers about the time of half-flood on the shore, at which time the flood stream begins to be felt in Alderney Race and around the Nez. The

* See Admiralty chart :—Channel islands and coast of France, No. 2,669 *a b* ; scale *m* = 0·5 inch.

Greniquet rock (page 6), in line with the low point of cape de la Hague, leads close to the westward of the foul ground off the Nez.

HUQUETS de JOBOURG is the name given to a rocky range lying parallel to and about $1\frac{1}{4}$ miles from the shore, between the bearings of S.W. and S.S.E. from the Nez-de-Jobourg. It extends rather more than 2 miles in a S.E. and N.W. direction, and the highest heads on it are named Basses St. Gilles, and Huquets de Vauville.

Basses St. Gilles are three rocky heads, and on the highest, at the north-east point of the above range, there are only 7 feet at low water. The western head, with 19 feet on it, lies at the western extreme of the range; and the third head, a small isolated rock with 5 fathoms on it, lies a quarter of a mile to the southward of the 7 feet. Rosel point seen opening of cape Flamanville, S. $\frac{1}{2}$ E., leads 6 cables to the westward of the western head; and the lighthouse at cape de la Hague in line with the summit of the Greniquet rock N.N.E. $\frac{1}{4}$ E., leads a quarter of a mile to the eastward of the 7 feet head, and midway between it and the Huquets de Jobourg.

It will be prudent, when running through the Race of Alderney, not to shut in Rosel point until well clear of these rocks, nor to bring cape de la Hague light during the night more northerly than N.E. $\frac{1}{2}$ N., unless within an hour of high water.

The highest rock on that part of Huquets de Jobourg range, which lies half a mile south-east of the St. Gilles, uncovers 13 feet at the lowest tides. Two small rocks, named the Calenfriers, lie upon the north-west part of the reef, and uncover 2 feet.

Huquets de Vauville lies a third of a mile to the eastward of the Huquets de Jobourg, and forms the eastern extremity of the range. This reefs is of small extent, and the highest head on it, which uncovers 15 feet at the lowest tides, is considered a half-tide rock by the pilots, who, when they are waiting in Vauville bay for the most favourable moment to cross Alderney Race, weigh when its summit is about 2 feet above water, and gain an offing in order to pass to the westward of the St. Gilles.

CAUTION.—The flood stream begins to gain strength when the Huquets de Vauville and the Dossière rocks are covered, and runs with great rapidity towards the dangers just described, as well as over the rocky barrier surrounding the Nez-de-Jobourg; a sailing vessel, therefore, entering the channel which separates the Huquets de Jobourg from the coast is liable to be drifted upon this barrier, unless the wind is favourable, and sufficiently strong to ensure her stemming the stream.

ANCHORAGES.—The coast of Normandy affords partial anchorage and shelter against easterly winds, but a stranger must carefully attend to the different leading marks, or in the event of thick weather, when these

cannot be discerned, he should anchor in such a depth as to allow for the falling of the tide, which along this coast may be estimated from 30 to 42 feet during the equinoxes, and from 14 to 20 feet during ordinary neaps, increasing in sailing southerly, and the reverse when sailing northerly.

The anchorages most free from the irregularities with which the ground along this coast abounds are, Vauville bay, Scioto bay, port Bail, St. Germain road, and Régneville road; but the three latter can be used by small vessels only, as there are not more than $2\frac{1}{2}$ or 3 fathoms in either at low water. The harbours along the coast all dry out at $2\frac{1}{2}$ hours ebb, and vessels begin to *sue* at about one hour ebb.

ANSE de VAUVILLE, formed between the Nez-de-Jobourg and cape Flamanville, affords good shelter against all winds from South, round easterly, to N.E., in 4 to 12 fathoms over a bottom of fine hard sand. This bay is much resorted to by merchant vessels and coasters overtaken by a calm, or unable to save their tide through the Race of Alderney, or for want of water to proceed to the southward over the flats lying to the southward of cape Carteret; but they should be prepared to weigh and gain an offing if the wind veers to the westward. When the wind blows off shore, and particularly from the S.E., there is a heavy surf on the beach, which renders landing impossible; but at the distance of one mile from the shore the sea is smooth, and there is but little swell. At the head of the bay, between Vauville and Siouville, which are distant from each other $4\frac{1}{2}$ miles, the shore at the foot of the high land is low and covered with sand-hills.

The coast for $2\frac{1}{2}$ miles to the south-east of the Nez-de-Jobourg is bordered by rocks as far as 3 cables from the shore; the most dangerous are the Huitrière, the Sidman, the Foraine, the Brequets, and the Ronde. The three first uncover from 10 to 11 feet at the lowest tides, and the Ronde 15 feet; the Brequets never cover.

Directions.—Having passed through the Race of Alderney, and intending to anchor in Vauville bay, the best shelter, with the wind between N.E. and East, will be found on the north side of the bay under the high land of the Nez-de-Jobourg; but to avoid the dangers off the Nez, do not bring the lighthouse at cape de la Hague to the northward of N.E. $\frac{1}{2}$ N., nor shut in Rosel point with cape Flamanville, until the Nez bears N.E. $\frac{1}{2}$ E., and Vauville church E. by S. $\frac{1}{2}$ S., when stand in for the anchorage on the latter bearing. With the wind between East and South the best shelter will be found under the high land of cape Flamanville on the south side of the bay; in rounding that cape, however, from the southward, care must be taken at night to avoid the foul ground off it, which may be done by keeping cape de la Hague light in sight to the westward of the Nez, or not to stand into less than 10 fathoms.

as the bottom is hard, every precaution must be taken to prevent the vessel from falling over.

A Life Boat is stationed at this port.

LIGHTS.—Two *fixed* harbour lights are exhibited at port Diélette, and when in line lead through the channel to the harbour. The outer is a *fixed* light exhibited at the extremity of the new pier, and shows *white* seaward and *red* towards the land from the bearing of S.S.E., this bearing of the white light leads clear to the westward of Huquets de Jerbourg, and the Basses St. Gilles. The light is elevated 23 feet above high water, and in clear weather the white light should be seen from a distance of 9 miles. The other is a *red* light 75 feet above high water; it stands 510 yards S.S.E. $\frac{3}{4}$ E. of the former, and may be seen 9 miles.

A small *green* light indicates the position of the old pier.

Directions.—The direction of the channel leading to port Diélette is pointed out by the tops of two remarkable little conical hills, forming the northern boundary of the valley of Diélette. When within a mile of the port, open the summit of the hill which has the ruins of an old semaphore on it, a little to the northward of the summit of the other hill, and keep a good look out for the beacon and lighthouse on new pier. As soon as the lighthouse is made out, steer to pass about half a cable to the northward of it, and then if bound into the old harbour, steer direct for the pier-head, which round as close as possible in order to avoid the Pierre de la Rivière.

With moderate winds between West, round Northerly, and N.E., the above directions can be followed by vessels drawing not more than 10 feet water, from half an hour before to half an hour after high water; but when the wind is fresh from that quarter they can only enter it at high-water spring.

With the wind between West and South a position should be gained to the south-west of the harbour before bearing up for the lighthouse. With a head wind the channel should not be attempted without a pilot.

Tides.—It is high water, full and change, in port Diélette at 6h. 40m.; springs rise 27 feet, neaps 20 $\frac{3}{4}$ feet, and the tide rises above the bottom at the entrance (which dries 16 feet above the level of the lowest tides), 17 feet at great springs, 14 or 15 feet at ordinary springs, and about 4 or 5 feet at neaps.

CAPE de FLAMANVILLE is a high bluff point, with a guard-house on its summit, bearing S. $\frac{1}{2}$ W. about 9 miles from the Nez-de-Jobourg. It should not be approached nearer than three-quarters of a mile, or within the depth of 10 fathoms at low water, as it is skirted with dangers extending half a mile from the shore; they, however, may be

When leaving this anchorage to enter the Race, weigh when the summit of the highest rock of the Huquets de Jobourg is about 2 feet above water, that is, at half or three-quarters of an hour before the commencement of the flood stream, to profit by the last of the ebb and the slack water to pass outside that reef and the St. Gilles; neglecting this precaution, there is danger of being drifted between the Huquets and the shore, where the rapidity of the stream and the badness of the bottom render anchoring impossible, and of being carried upon the rocks off the Nez, where the stream runs with great violence.

PORT de DIÉLETTE, situated in the southern part of Vauville bay at 2 miles north-east of cape Flamanville, has two harbours sheltered from N.E., round easterly, to S.W. by the high land, and from S.W. round westerly, to North by a new pier, which has been constructed a short distance westward of the old pier, and forms the outer harbour, having in its entrance a depth of 3 feet at low water, ordinary springs; the bottom of this harbour consists of soft sand with a few ledges of rocks, one to 6 feet above the sand (these rocks are being removed May, 1881).*

The northern side of the channel leading to these harbours is marked by a beacon placed on a rock which uncovers 17 feet, E. by N. $\frac{1}{4}$ N. 197 yards from the end of the new pier, and N. $\frac{3}{4}$ W. 344 yards from the old pier-head. This rock forms the southern edge of a rocky bed joining the shore north-eastward of the harbour, and which in rough weather greatly breaks the force of the sea. This channel lies in a north-westerly direction, and is only about a cable broad, being narrowed by low rocky ledges, which uncover at low water a cable outside the beacon and the end of the new pier. These ledges are low, and cause in rough weather a heavy sea, which will be avoided by keeping in the direction of the channel. Near the entrance of the old harbour the channel is suddenly narrowed by a rock, named Pierre de la Rivière, dangerous to vessels working in; it lies E. by N. $\frac{1}{4}$ N. 95 yards from the old pier head.

The old harbour will admit vessels of about 10 or 12 feet draught at springs; but the entrance is so surrounded by rocks that access to it is hazardous to strangers, except at high water and with a leading wind.

The entrance to this harbour, which is 72 yards wide and open to the N.N.E., is comprised between the head of the old pier and the extreme of a little pile of loose stones on the steep shore of the eastern part of the harbour. The sand at the entrance dries 16 feet above the level of the lowest tides, and thence the bottom, which is composed of sand and gravel, takes a gentle ascent up to the level of high-water neaps. The best position to ground is about two-thirds the length of the pier from the pier-head, but

* Commander C. V. Anson, H.M.S. *Dasher*.

as the bottom is hard, every precaution must be taken to prevent the vessel from falling over.

A Life Boat is stationed at this port.

LIGHTS.—Two *fixed* harbour lights are exhibited at port Diélette, and when in line lead through the channel to the harbour. The outer is a *fixed* light exhibited at the extremity of the new pier, and shows *white* seaward and *red* towards the land from the bearing of S.S.E., this bearing of the white light leads clear to the westward of Huquets de Jerbourg, and the Basses St. Gilles. The light is elevated 23 feet above high water, and in clear weather the white light should be seen from a distance of 9 miles. The other is a *red* light 75 feet above high water; it stands 510 yards S.S.E. $\frac{3}{4}$ E. of the former, and may be seen 9 miles.

A small *green* light indicates the position of the old pier.

Directions.—The direction of the channel leading to port Diélette is pointed out by the tops of two remarkable little conical hills, forming the northern boundary of the valley of Diélette. When within a mile of the port, open the summit of the hill which has the ruins of an old semaphore on it, a little to the northward of the summit of the other hill, and keep a good look out for the beacon and lighthouse on new pier. As soon as the lighthouse is made out, steer to pass about half a cable to the northward of it, and then if bound into the old harbour, steer direct for the pier-head, which round as close as possible in order to avoid the Pierre de la Rivière.

With moderate winds between West, round Northerly, and N.E., the above directions can be followed by vessels drawing not more than 10 feet water, from half an hour before to half an hour after high water; but when the wind is fresh from that quarter they can only enter it at high-water spring.

With the wind between West and South a position should be gained to the south-west of the harbour before bearing up for the lighthouse. With a head wind the channel should not be attempted without a pilot.

Tides.—It is high water, full and change, in port Diélette at 6h. 40m.; springs rise 27 feet, neaps 20 $\frac{1}{2}$ feet, and the tide rises above the bottom at the entrance (which dries 16 feet above the level of the lowest tides), 17 feet at great springs, 14 or 15 feet at ordinary springs, and about 4 or 5 feet at neaps.

CAPE de FLAMANVILLE is a high bluff point, with a guard-house on its summit, bearing S. $\frac{1}{2}$ W. about 9 miles from the Nez-de-Jobourg. It should not be approached nearer than three-quarters of a mile, or within the depth of 10 fathoms at low water, as it is skirted with dangers extending half a mile from the shore; they, however, may be

avoided at night by keeping the light at cape de la Hague in sight to the westward of the Nez.

ANSE du SCIOTOT, formed between cape Flamanville and Rosel point, affords shelter from all winds between E.N.E., round easterly, and S.E., in from 7 to 10 fathoms over a sandy bottom.

POINTE du ROSEL.—The shore is low and sandy from the head of Sciotot bay to Rosel point, which bears S. $\frac{1}{2}$ E. about $3\frac{1}{2}$ miles from cape Flamanville, and terminates abruptly in a bluff rocky promontory, on the summit of which stands a guard-house. The point is skirted by a rocky ledge running off nearly 3 cables in a S.W., and $6\frac{1}{2}$ cables in a N.N.W. direction from the foot of the cliffs, and it should not be approached nearer than $1\frac{1}{2}$ miles, or within the depth of 10 fathoms, to avoid the foul ground extending a mile to the westward of the point. At night the light at cape de la Hague kept in sight to the westward of the Nez-de-Jobourg leads well outside of the foul ground.

CAPE de CARTERET bears S. $\frac{1}{2}$ W. 6 miles from Rosel point, and forms the west extreme of the steep hill which bounds the entrance of Carteret harbour to the westward. This hill is the first high land on the coast to the northward of Granville, and is separated from the high land of the interior by a valley nearly 600 yards wide, and almost entirely filled up by sand from the neighbouring sand-hills. The cape is a little higher than Rosel point, and may be seen in clear weather 17 or 18 miles off; it terminates in an abrupt declivity, beneath which is a cliff of sloping rocks. A lighthouse stands about 100 yards to the eastward of the extremity of the cape.

A Life Boat is stationed at cape Carteret.

LIGHT.—The lighthouse on cape Carteret exhibits a *revolving* white light, the eclipses of which succeed each other every *half minute*, and are not total in ordinary weather within the distance of 8 miles. The light, which is of the second order and elevated 262 feet above high water, is seldom hidden by fog, and is visible in clear weather from a distance of 18 miles.

No hidden dangers appear to lie in the offing between cape Flamanville and cape Carteret, except the Plateau des Trois Grunes; but from the broad sandy beach between those capes shallow water extends from $1\frac{1}{4}$ to $2\frac{1}{4}$ miles, and it must be avoided at low tide. The most prominent parts of these shallows are, the Roches du Rit, the Basse Bihard, Le Caillou, and the Bancs de Surtainville; the former dries, and the latter break at the lowest tides.

Roches du Rit.—The beach between cape Carteret and Rosel point is from one quarter to three-quarters of a mile broad at low water, and several rocky ridges dry on it, the highest and most dangerous of which are the

Rit rocks. The southern extremity of this ridge lies about 7 cables in a N.W. direction from cape Carteret, and thence the ridge extends N.N.W. one mile, and terminates $1\frac{1}{2}$ miles N.W. $\frac{1}{4}$ W. from the lighthouse. The slope of Nez-de-Jobourg, half a point open to the westward of cape Flamanville, N. $\frac{3}{4}$ E., leads half a cable to the westward; and the southern edge of the ridge is avoided by not going to the northward of a line on which the steeple of Port Bail is in line with the foot of the escarpment under the battery at the extremity of cape Carteret, S.E. $\frac{1}{4}$ S., but this mark can only be seen at high water, on account of sand-hills intervening between the steeple and the cape. Care must be taken not to approach too close to the cape at low-water springs, as rocky heads, with only 4 and 5 feet water on them, lie half a mile in a W.S.W. direction from the lighthouse.

Basse Bihard, the outermost of the above dangers, is a small rocky flat, not more than $1\frac{1}{2}$ cables long, in a S.E. and N.W. direction, and three-quarters of a cable broad, with only 6 feet on its highest head at the lowest tide. This shoal head lies N. by W. $\frac{2}{3}$ W. 5 miles from cape Carteret lighthouse, and W.S.W. $2\frac{3}{4}$ miles from Rosel point; at low water it is very dangerous, and the overfalls cause a heavy sea over it at all times of tide. The thwart mark for it is, Les Pieux church open to the northward of Rosel point, and in line with a remarkable red-tiled house near the beach, N.E. $\frac{3}{4}$ E. By day, Rosel chapel open to the northward of the north part of Rosel point leads clear to the northward; and by night, cape de la Hague light just open to the western slope of the Nez-de-Jobourg leads half a mile to the westward.

Buoy.—A red buoy is moored in 11 fathoms about $1\frac{1}{2}$ miles westward of Basse Bihard, with cape Flamanville bearing N.E. $\frac{1}{2}$ N., and cape Carteret S.S.E. $\frac{3}{4}$ E.

Le Caillou, an isolated rocky head with only 12 feet on it, lies E. $\frac{1}{2}$ S. half a mile from the Bihard, from which it is separated by a sandy bottom with 8 to 9 fathoms on it. This rock is still more dangerous than the Bihard, as there are no certain marks for it; but Jobourg church steeple in line with the extreme of cape Flamanville, N. by E. $\frac{1}{2}$ E. will lead half a cable to the eastward.

Bancs de Surtainville are four long narrow ridges of sand and broken shells lying to the south-east of the Bihard and the Caillou, occupying a space of $1\frac{1}{2}$ miles in a S.E. and N.W. direction, and in some measure unite those dangers with the beach. There are from 18 to 22 feet on the two western banks, 12 to 21 feet on the middle, and 19 feet on the south-eastern bank, at the lowest tides. As these little banks lie athwart the streams they occasion a heavy sea when blowing fresh. Jobourg church steeple in line with the extremity of cape Flamanville, N. by E. $\frac{1}{2}$ E., leads between the two western banks.

PLATEAU des TROIS-GRUNES.—This dangerous rocky ledge, lying with its northern extreme bearing W. by N. $\frac{3}{4}$ N. $3\frac{3}{4}$ miles from cape Carteret, is about a mile long in a N.W. and S.E. direction, from one quarter to three-quarters of a mile broad, and has from 6 to 9 fathoms around it. It is composed of a dozen rocky heads, two of which uncover from 3 to 5 feet above the lowest tides on the south-east extremity of the ledge, and are half a cable apart.

From the highest head, which dries 5 feet, cape Carteret bears E. by S. $3\frac{1}{2}$ miles, the south extreme of the Rit rocks East 3 miles; the summit of cape Carteret is between the tower of the lighthouse and the little battery at the foot of the cape, E. by S., and Rozel mill, Jersey, is just open to the south-east of Grande Rousse rock, (Écréhos group) S.W. by W. $\frac{3}{4}$ W.

There are 4 or 5 rocky heads on the north-west part of this ledge, the highest of which has 5 feet water on it, and lies with the northernmost of two remarkable mills at Vislet or Brenier, a little open to the southward of the southernmost fort on cape Carteret, E.S.E., and the western part of Mont Orgueil castle (Jersey) in one with the eastern side of the Petite Rousse rock (Écréhos) S.W. $\frac{1}{4}$ S. The overfalls in the vicinity of the ledge are very violent.

The Vieille rock (Écréhos) in line with Mont Orgueil castle, S.W. $\frac{1}{4}$ W., leads $3\frac{1}{2}$ cables to the eastward of the highest head on the south-eastern part of the ledge; the square tower of Barneville church in sight to the southward of cape Carteret, E. $\frac{1}{2}$ S., leads three-quarters of a mile to the southward; St. George church-steeple in line with the foot of the southern slope of the hill of cape Carteret, S.E. by E. $\frac{1}{4}$ E., leads 6 cables to the northward of the northern part of the ledge (this steeple may be easily recognized by the parsonage, a long white house which appears in this direction); the south-eastern fort on cape Carteret shut in with the western pitch of the cape (on which there is a battery), S.E. by E. $\frac{1}{2}$ E., or Bonneliers shut in to the northward of the cape will also lead clear to the northward; and Mont Orgueil castle appearing its own apparent breadth open to the westward of Grande Rousse rock, S.W. $\frac{3}{4}$ S., will lead to the westward.

A bank of sand and broken shells lies $3\frac{1}{2}$ miles to the north-west of the Trois-Grunes, and 5 miles to the northward of the Drouilles, with 9 fathoms, and 11 to 14 fathoms around, at low-water springs. It is about 4 cables long in a N.E. and S.W. direction, and a cable broad, and is not of itself dangerous, but causes a strong overfall, which small vessels should avoid, when blowing fresh.

Buoy.—A conical buoy marked with the letter K. and painted in horizontal bands alternately black and red, is moored S.W. by W. $\frac{1}{4}$ W., about one-third of a mile from the eastern head of Trois-Grunes.

Les BASSES de TAILLEPIED.—These shoals lie nearly midway between the Écréhos rocks and cape Carteret, and with the Félés banks form one bank, occupying a space 4 miles long in a N.W. and S.E. direction, and about 2 miles broad. The Taillepieid lie on the west side of the Félés, and extend $2\frac{3}{4}$ miles N.N.W. and S.S.E., and are 3 cables broad. They are composed of from 20 to 25 rocky heads, the highest of which lies on the northern part of the chain, and uncovers 2 feet at the lowest tides; the other heads have from one to 14 feet on them at the same period.

The marks for the rocky head of 8 feet lying on the north extreme of the chain, S.W. $\frac{1}{3}$ W. $4\frac{1}{10}$ miles from cape Carteret, are, Rozel windmill, Jersey, just showing to the northward of the north point of Maître île (Écréhos), W. by S. $\frac{1}{4}$ S., and Mabire windmill in line with the eastern slope of the hill of cape Carteret N.E. by E. $\frac{1}{4}$ E.; Mont Orgueil castle, Jersey, in line with Maître île S.W. by W. leads to the northward of it in 3 fathoms at low water.

The marks for the rocky head of 9 feet on the southern end of the chain are Pleinmont point, Jersey, open to the northward of Ronez point, W. by N. $\frac{1}{2}$ N., and St. Pierre steeple well open to the eastward of cape Carteret, N.E. $\frac{1}{2}$ N.; Rozel windmill in line with La Coupe point, W. $\frac{3}{4}$ N., leads three-quarters of a mile to the southward of the south end of the shoals.

Les BANCS FÉLÉS, lying to the eastward of the Taillepieid shoals, are composed of coarse sand and shingle, and form about 20 small narrow parallel ridges, averaging about 3 cables in length. The ridges lie close together, nearly at right angles to the flood and ebb streams, and occupy a space 2 miles long in a N.W. and S.E. direction, and half a mile broad. Three of the ridges dry at the lowest tides, and there are from 2 to 4 feet over the remainder at the same period.

The north-west extreme of the Félés, which has a patch of 13 feet on it, lies S.W. by S. $4\frac{3}{10}$ miles from cape Carteret lighthouse, and S. by E. the same distance from the Trois-Grunes; the south-east extreme, which has an 8-foot patch on it, lies S. $\frac{3}{4}$ W. $5\frac{3}{10}$ miles from the lighthouse. Cape Flamanville just open and shut with cape Carteret, N. $\frac{1}{4}$ E., leads very close to their south-east extreme, and the steeple of port Bail between the mills of Cartelet, N.E. by E. $\frac{3}{4}$ E., leads 3 cables S.E. of it; these mills stand 600 yards to the eastward of the mill of Bien Aimé. St. Martin church spire, Jersey, in line with the lighthouse on St. Catherine breakwater, W. $\frac{3}{4}$ N., leads to the south-east of Écrevière, Taillepieid, and Félés banks.

The Taillepieid and Félés form two passages, one $2\frac{1}{4}$ miles wide at low water, between the Félés and the French coast, with patches of from 6 to 12 feet in it, and the other $1\frac{1}{2}$ miles wide, between the Taillepieid and the Écréhos rocks, with a patch of 11 feet at low water in its southern

entrance ; but from the great rapidity of the streams there is generally a turbulent sea in the latter passage, even in the finest weather, and in rough weather it would be exceedingly dangerous for small vessels to attempt it. The former passage is invariably used, for although the depth in it is not so great as in the latter, the leading mark is good, which the latter is entirely destitute of.

ASPECT of COAST.—Between cape Flamanville and cape Carteret the land near the shore is high and appears double, and thence to Régneville it is altogether as low, rising again towards Granville. The coast is woody, and skirted all along with a white sandy beach, and prettily diversified by villages, churches, and windmills, for the most part within a mile of each other, and which, being built of stone, assume generally a whitish appearance. The land in the interior is lofty, though somewhat irregular, alternately ascending and descending until the neighbourhood of Coutances is approached, where it assumes more regularity. These inequalities are very conspicuous between, and in the rear of Barneville and St. Germain.

The low sandy shore southward of cape Carteret, which the entrance to Carteret harbour and the cape interrupts for about the space of a mile recommences at the foot of the cape, and extends almost in a direct line as far as Rosel point. Between the cape and the point the coast is studded with sand-hills, and those named Dunes de Hatainville are, on account of their height, very remarkable, some of them exceeding the height of the summit of cape Carteret. Between the Dunes and Rosel point there is a small low plain, bounded to the eastward by the last line of hills from the interior.

The most conspicuous objects on the land between cape Carteret and St. Germain are, mont Gardon, mont Doville, and the hills of Benneville ; on the first stands the village of mont Gardon and two mills, $3\frac{1}{2}$ miles from the sea, and N.E. 3 miles from St. Germain ; the second $2\frac{1}{2}$ miles to the northward of mont Gardon, and $6\frac{1}{2}$ miles to the eastward of port Bail, has a windmill on its summit ; and Benneville hill, the third, rises E.N.E. 4 miles from port Bail, and has three windmills on it.

The coast between St. Germain and Régneville trends nearly in a straight line N.N.E. and S.S.W. for 13 miles, and the shore is low and sandy, and bordered with downs. Among the most remarkable objects is mont Huchon, situated 6 miles in the interior, to the eastward of the entrance to Régneville harbour and of the western part of the line of hills which is immediately to the northward of the harbour and on which stands the village and church of Agon. This part ends abruptly with steep slopes towards the sea, and presents, when seen from a distance to the south-east, the appearance of a high cape facing westward.

Coutances cathedral, about 6 miles inland, is lofty, and may be known by its two spires or turrets, which occasionally appear like the Reculvers in Kent. The church-steeple of Agon is a large square tower covered with tiles, and the little church-steeple of Pirou very much resembles it. From Coutances towards Granville the interior of the country presents nearly a regular surface, which terminates at Champeaux point, a bluff and nearly perpendicular headland about 6 miles to the southward of Granville.

The sandy beach bordering the coast uncovers in some places $1\frac{1}{2}$ and $2\frac{1}{2}$ miles to seaward, with reefs of dangerous rocks scattered on it in all directions, which render the approach dangerous. There are several small havres or harbours, named Carteret, port Bail, Surville, St. Germain-sur-Ay, Geffosse, and Régnerville, between cape Carteret and Granville capable of affording shelter to small vessels of 40 to 50 tons.

HAVRE de CARTERET, situated a mile to the eastward of cape Carteret and N.N.W. 4 miles from port Bail, will admit vessels of $10\frac{1}{2}$ to $11\frac{1}{2}$ feet at springs, from half an hour before until half an hour after high water. The entrance, about a cable wide, is at the foot of the steep eastern part of the cape, and open from S.S.W., round westerly to N.W. The ebb stream runs with great velocity out of the harbour.

Directions.—The channel into Carteret harbour is between two sand-banks, and the mark for leading in is, Cartaret steeple in line with the eastern steeple of St. Pierre-les-Moutiers, N.E. $\frac{3}{4}$ N., which mark would suffice for following the channel if the latter steeple were not lost sight of when closing in with the land. When the mark, therefore, is hidden, steer for the beacons, which must be left on the port hand on entering. The north-west beacon marks the extreme of a little rocky point near the foot of the hill of the cape; and the second, which stands on rocky ground and marks the side of the channel, must be left from 10 to 16 yards to the westward.

HAVRE de PORT BAIL, the entrance to which bears S.S.E. $4\frac{1}{2}$ miles from cape Carteret lighthouse, is the best harbour between cape de la Hague and Granville, but it is only accessible at spring tides between one hour before and one hour after high water. The bottom of the harbour, like that of Carteret, is composed of sand, and dries between the periods of half ebb and half flood at springs.

The entrance, which is not more than a cable wide, is open to the S.W., and lies between the south point of the harbour and a sandy islet, on which there is a custom-house station. This islet is from 25 to 30 feet above the level of the bottom of the harbour, and bears W.S.W. $5\frac{1}{2}$ cables from the village of port Bail. To the south-east of the islet there is a bed, composed of pebbles and small stones, about a cable in extent, which should

be avoided; and to the southward of the islet, a rock that does not cover. The little river Grise discharges itself at the bottom of the harbour.

LIGHTS.—Two fixed harbour lights are established at port Bail, the inner *red* light being shown from the church tower, and the outer white light from point Dune distant from the inner light S.W. by W. $\frac{1}{2}$ W. 953 yards. The red light is visible in clear weather 9 miles, and the white light 7 miles; and when in line lead into the port.

Directions.—The leading mark into this harbour is the steeple of port Bail, between the two mills of Carteret, N.E. by E. $\frac{1}{2}$ E. The berth where the tide rises the highest is on the bed of the fresh-water stream, to the E.N.E. and East of the south point of the harbour, but it is an uneasy position when it blows strong from N.N.W.; the tide rises here from $16\frac{1}{2}$ to $19\frac{1}{2}$ feet at springs, but in running in, the lead must be kept going to avoid the bank of the stream.

The best berth is about 2 cables S.W. of the guard-house, which stands near the shore 3 cables S.S.E. of the steeple of port Bail, where a vessel will be sheltered from all sides except from the W.N.W.; but the tide rises about $3\frac{1}{2}$ feet less in this berth than in the preceding one. Coasters take up a position in the bed of the stream in front of the village.

Basses de Port Bail are three small rocky ledges and a small sand-bank, lying in front of the entrance of port Bail. The first, which has two rocky heads of equal height with 6 feet water, lies about a mile from the shore with Gouey church-steeple seen between port Bail church steeple and the sandy islet at the entrance of the harbour, E. $\frac{1}{4}$ N., and cape Carteret lighthouse N. by W. The second is a very small head, with 8 feet over it, lying W.S.W. 4 cables from the first, and S. $\frac{1}{2}$ E. 4 miles from cape Carteret. The third ledge, with 9 feet over it, lies North 6 cables from the second, $1\frac{1}{2}$ miles from the shore, and S. $\frac{1}{2}$ E. $3\frac{1}{2}$ miles from the cape, with Omonville church-steeple in line with the extreme of the south point of the harbour, E.S.E. The bank has 8 feet on it, and lies about $1\frac{1}{2}$ miles from the shore, with Gouey steeple in one with the summit of the islet at the entrance of the harbour, E. by N.

Two rocks, named the Jument and the Grande Rocher, lie to the S.W. of the entrance of port Bail. The first is distant $1\frac{3}{10}$ miles from the south point of the entrance, and uncovers $11\frac{1}{2}$ feet at the lowest tides; and the other is $1\frac{1}{2}$ miles from the same point, and uncovers $14\frac{3}{4}$ feet.

HAVRE de SURVILLE, situated S. by E. $\frac{1}{2}$ E. $7\frac{1}{4}$ miles from cape Carteret, is small, with a sandy bottom, and will not admit a vessel drawing more than 7 feet at high-water springs. The bottom outside the entrance, as far as 3 miles to the south-west of it, is very uneven, several little ridges rising from it, with from 8 to 18 feet over them at the lowest tides. A small rocky ridge, with only 4 feet over the highest head, and

from 12 to 19 feet close to, lies S.S.W. $\frac{1}{2}$ W. $1\frac{1}{4}$ miles from the semaphore on the sand-hills at the south point of the entrance; no marks can be found for this dangerous reef.

HAVRE de St. GERMAIN-SUR-AY, lying S. by E. 12 miles from cape Carteret, and N.E. by N. 4 miles from the Sac-de-Pirou rocks, will admit a vessel drawing 7 or 8 feet at high-water springs; but a vessel of that draught will be neaped in it for 5 or 6 days. The sand-banks, both inside the harbour and at the entrance, are so shifting that it would not be prudent to enter without the aid of a pilot. It is well sheltered on all sides by the land except from S.W. to South, and strong winds from these quarters send in a heavy sea.

The beach uncovers $1\frac{1}{2}$ miles outside the entrance, and several rocks rise from it, exactly in the fairway. The highest and nearest the entrance uncovers 25 feet at the lowest tides, and is named the Cabot; it lies S. $\frac{3}{4}$ E. 8 cables from the guard-house on the west point of the entrance, with the guard-house just open to the eastward of the old semaphore. The channel leading to the harbour is very narrow, and is formed between the Cabot and a rock, about the same height, lying 3 cables N.N.W. of it. The leading mark in is, St. Germain church-steeple in line with a remarkable gap in the sand-hills on the long and narrow eastern point of the entrance bearing, N.E. $\frac{1}{2}$ E. When the Cabot is covered, there are 4 or 5 feet at the entrance.

The Cabot forms the south-east extreme of a rocky ridge extending $1\frac{1}{2}$ miles to the westward from the west point of the entrance. The southern part of this ridge is composed of rocks which do not cover during the neaps, and they are the highest between St. Germain and cape Carteret. A sand-bank, with only 7 feet on it at the lowest tides and 18 to 22 feet around it, lies $1\frac{1}{4}$ miles outside the ridge, and W. $\frac{1}{2}$ N. $2\frac{1}{4}$ miles from the old semaphore. This little bank is extremely dangerous to coasters working along the shore, and as no marks can be given for it, they should keep from $2\frac{1}{2}$ to 3 miles from the land.

ROCHES du SAC-de-PIROU lie $1\frac{1}{2}$ miles from the coast, just outside the beach which dries at low water, S.W. by S. 4 miles from the entrance of St. Germain, and $1\frac{1}{2}$ miles to the N.W. of the little harbour of Geffosse. They form the western part of a long ridge, 6 cables wide, which extends to the north-east as far as the shore; the highest head uncovers 5 feet, and the westernmost head $4\frac{1}{2}$ feet at the lowest tides. The marks for the western head are, mont Survent church-steeple, which stands upon the high land 4 miles in the interior, just open to the northward of Geffosse church-steeple, S.E. $\frac{1}{2}$ E.; and Bretteville church-steeple open to the westward of the hill, which rises a little to the westward of the old semaphore on the west point of the entrance of St. Germain, N.N.E.

A sand-bank, one mile long from north to south, and half a mile wide, lies two-thirds of a mile westward of the above rocks, and 2 miles from the coast, and has only from 4 to 8 feet water on it at the lowest tides. It is dangerous to vessels working close in shore, and may be avoided by keeping to the westward of the line on which mont Gardon church-steeple is in one with the guard-house of the battery on the west point of the entrance of St. Germain, bearing N.E. $\frac{1}{4}$ E. There are also two small sand-banks, with 7 and 8 feet water over them at the same time of tide, between the Sac-de-Pirou and the Senequet rock; in fact, at $2\frac{1}{2}$ miles from the shore, between the Senequet and St. Germain, the depth does not average more than 15 feet.

HAVRE de GEFFOSSE, situated S.S.W. $4\frac{1}{2}$ miles from St. Germain, and E.N.E. $3\frac{1}{2}$ miles from the Senequet rock, is very small and confined, and only capable of affording shelter to small fishing boats of about 10 tons burthen. The harbour is quite open to the W.N.W., and when it blows strong from that quarter, there is a nasty tumble of a sea at the entrance.

CHAUSSÉE-des-BŒUFS are ledges of dangerous rocks $2\frac{1}{2}$ miles long and one mile broad and extend in an east and west direction. They lie $4\frac{1}{2}$ miles south-eastward of the Grande Anquette, nearly 6 miles from the French shore at high water, and appear at 4 hours ebb, but some of the heads show only at low water, besides many which are always covered. In the vicinity of these rocks the ground is very foul, and dangers are scattered in all directions, principally, however, to the northward, westward, and southward, though among them there are from 2 to 7 fathoms at the lowest tides.

Le Bœuf.—The marks for this rock, which uncovers 18 feet at the lowest tides, are, Seymour tower, Jersey, touching the south side of the Grande Anquette, N.W. $\frac{1}{2}$ W.; Icho tower in line with Noirmont tower N.W. by W., and Hatainville sand-hills seen between capes Carteret and Flamanville. The Bœuf is surrounded for the space of 4 cables by small rocky heads which uncover 4 and 5 feet.

A tower is in course of construction (1881) on this rock.

Les Bœuftins lie half a mile to the westward of the Bœuf in small detached ridges, the highest of which uncovers 9 feet.

Basse Occidental des Bœufs, situated near the west side of the Chaussée des Bœufs, is a very small detached rock, with only 4 feet water. It lies about W.N.W. one mile from the northern Bœuftins rock, which dries 7 feet at low water.

From the rock, Princes tower appears a little open eastward of Grande Anquette N.W. $\frac{3}{4}$ N.; La Coupe turret in line with St. Catherine's break-

water lighthouse N.N.W. westerly, and the steeple of Coutances cathedral just open northward of Blainville church-steeple S.E. by E.

Basse Nord-Ouest des Bœufs is formed by a small ridge of rocks 3 cables long from east to west, and united to the Bœuf and Bœuftins by a rocky bed on which there are from 4 to 5 fathoms. The highest head of this ridge uncovers 2 feet, and lies N.W. $\frac{2}{3}$ N. $1\frac{3}{10}$ miles from the Bœuf with Seymour tower a little open southward of the South hill, N.W. $\frac{3}{4}$ W., and the Bœuf between the church steeples of mont Martin and Agon S.E. $\frac{1}{2}$ S.

Basse Jourdan.—This small rocky ridge, a cable long, east and west, with only 2 feet on it, lies E. by S. $1\frac{1}{4}$ miles from the Bœuf, and N.W. $3\frac{1}{2}$ miles from the Senequet rock. The marks for it are, Blainville church in line with the northern sandy point of Blainville harbour, or with the south side of the Senequet; Gouville church open to the northward of mont Huchon S.E. by E. $\frac{1}{2}$ E.; and cape Carteret in line with the highest of the Hatainville sand-hills, which are seen from a great distance on account of their whiteness and the contrast between them and the dark land of capes Carteret and Flamanville.

This danger is marked on its eastern side by a red and black bell buoy with staff and reflector.

Bœuf Patch lies north $1\frac{1}{2}$ miles from the Basse Jourdan, and is $1\frac{1}{2}$ miles long from north to south, and nearly half a mile broad in its widest part. It has 3 fathoms on the southern end and 15 feet on the northern extreme. The marks for the 15 feet are, Vesly church touching the south extreme of the west point at the entrance of St. Germain E. $\frac{3}{4}$ N.; Coutances cathedral just open north of Liverville church S.E. $\frac{1}{2}$ S.; and Agon church just open to the eastward of Senequet lighthouse S.S.E. $\frac{1}{2}$ E.

Directions.—A vessel will pass eastward of Basse Jourdan by not opening the Hatainville sand-hills westward of cape Carteret. Coutances cathedral twice its own breadth open southward of Blainville church steeple S.E. by E. $\frac{1}{4}$ E. leads 2 cables southward of the south-west extreme of Chaussé-des-Bœufs; Princes tower just open westward of Grande Anquette, N.W. by N. leads westward of the west extreme; and Grande Anquette in line with Ichô tower, N.W. by W. $\frac{1}{2}$ W. will lead 3 cables northward of the 2-feet rock on the Basse Nord-Ouest des Bœufs.

Hatainville sand-hills just shut in by cape Carteret, N. $\frac{3}{4}$ E. clears the eastern side of the Bœuf patch; Princes tower one quarter of a point open to the southward of Mont Orgueil castle, the north end; Ichô tower its breadth open to the northward of Grande Anquette, N.W. by W. $\frac{2}{3}$ W., the south end; and cape Carteret lighthouse N. by E. $\frac{3}{4}$ E. clears the west side.

There is a passage a little more than one mile wide between the Chaussée-des-Bœufs and the Bœuf patch, with from 5 to $5\frac{1}{2}$ fathoms in it at low water. La Bergerie in line with Seymour tower, N.W. by W. $\frac{1}{4}$ W.

or Blainville church four times its breadth open to the northward of the Senequet rock, will lead through the passage; but it is difficult to make out Blainville church at all times, and both ebb and flood will act upon the vessel's beam.

Should a vessel find it necessary to navigate in the northern vicinity of the Chaussée-des-Bœufs after half ebb, or before half-flood (very dangerous periods), La Bergerie must be kept open to the northward of Seymour tower, and Bouley signal-station must be kept open to the northward of Rozel mill a quarter of a point; it will then also be just open of Rozel manor-house.

The Chaussée-des-Bœufs and the Anquettes being on all sides beset by a great number of detached dangers, the utmost caution is necessary, when in a large vessel, to navigate with any degree of safety between them, more especially as there exists but one continuous leading mark for the passage, viz., the church of St. Pierre-les-Moutiers, which has a very short turret and is situated on the high land to the eastward of cape Carteret (apparently in the middle of the village, and the only church so situated), kept open a quarter of a point to the eastward of the south-eastern pitch of that cape, N.N.E. $\frac{3}{4}$ E.; and even this is not quite conspicuous enough, neither do the objects shift with sufficient quickness for so narrow and intricate a passage at low water. It will, however, serve when coming from the northward, between half-flood and high water, but is too far distant to be of any service to a stranger, when entering this passage from the southward, unless the weather be unusually clear.

The above mark, when coming from the northward, must be carefully preserved until La Moye signal post comes open of Le Fret point N.W., or until Coutances cathedral appears within its own apparent breadth of Agon church E. by S. $\frac{3}{4}$ S., and it must ever be remembered that the tide obliquely crosses the course.

The sea to the southward of the Anquettes and the Bœufs, for a great distance, is much encumbered with sunken rocks, and banks of sand and gravel, having from 4 to 6 fathoms on them at low water; indeed between the former rocks and the Chausey islets scarcely a spot can be found quite free from either, and in boisterous weather the whole of that space exhibits one continued sheet of broken water. The proper channels will be found to lie eastward and westward of this accumulation of dangers, and are pretty clear.

BASSE le MARIE, a rocky ledge nearly 4 cables long, east and west, and 2 cables broad, lies 3 miles to the southward of the Southern Anquettes, its highest head at the eastern end of the ledge uncovering $4\frac{1}{2}$ feet at the lowest tides. Near the middle of the ledge there is another head which comes awash, and one on the western extremity with 15 feet

over it at the same time of tide. The ledge has 4 to 7 fathoms around it, over a sandy bottom mixed with pieces of shell.

The highest head on the ledge lies W. $\frac{1}{4}$ S. $4\frac{1}{2}$ miles from the western edge of the Nattes rocks, S.S.W. $\frac{3}{4}$ W. $4\frac{3}{4}$ miles from the Bœuf rock, and N. by W. $\frac{7}{8}$ W. $5\frac{6}{10}$ miles from Catheue reef, with Coutances cathedral its own breadth open southward of Agon church E. by S. $\frac{1}{2}$ S., and Rozel house (Jersey), in line with Archirondel tower, N. by W. $\frac{3}{4}$ W. Coutances cathedral its own breadth open northward of Agon church tower, E. by S. $\frac{3}{4}$ S., leads northward of the ledge, though close to it; Mont Martin church and mill in line, S.E. by E. $\frac{1}{3}$ E., leads to the southward; the Etat or Petite Canue (Chausey) midway between Huguenans islets, S. by W. $\frac{2}{3}$ W., leads between it and the Catheue; and the Etat in line with the Conchée leads westward of it, as will also the Hamon rock when exactly in line with the western apex of Grande Ancre islet, S. by W. $\frac{1}{2}$ W.

Buoy.—A red and white horizontal striped buoy is moored at half a mile east of Besse le Marie.

PLATEAU des MINQUIERS, situated 9 miles to the southward of Jersey, and 13 from the nearest French land, is a tangled mass of rocky reefs, 16 miles long east and west by 8 broad. The most dangerous part occupies a space, near its middle, about 7 miles long east and west, and 4 broad. The masses of rock at this part lie closer together, in ridges, and are more elevated; a large number being generally awash at high water; a few scattered rocks only rising above that level to the height of 10 to 20 feet.

These rocky groups are generally connected by extensive banks of shingle, gravel, and sand. There are, however, some narrow and tortuous channel through this part of the reef, but from the strength of the tides, and absence of good marks, the pilotage is too difficult for any but the fishermen by whom they are frequented.

The whole of the sunken part of this reef to the eastward is studded with dangerous rocks; some of which dry with the tide to the height of 7 feet at low water, but a far greater number are just awash or have not more than 3 to 6 feet over them at that period. The sunken part of the west end of the reef has comparatively few dangers, and as moreover at that part of the plateau there is some good clear ground for anchorage, in 10 and 12 fathoms, any vessel accidentally set within the danger line could anchor and remain until the turning of the stream would favour drifting away from the reef again.

The north-western rocky chump of the elevated part of the reef is called the Pipette group, and is remarkable from having several flat-topped pillar-like rocks in it. It is a spot most fatal to shipping; more wrecks

never covers, and therefore serves as a good mark for the other dangers in the neighbourhood.

A reef named Grunes de Norman, the highest head of which uncovers 14 feet, lies W. by S. $\frac{1}{2}$ S., 5 cables from Haute Grune.

Les Faucheurs, is the name given to a large extent of rocks, three heads of which never cover; they lie W. $\frac{1}{2}$ N., 3 miles from Maitresse île, and S.E. by S., $1\frac{1}{4}$ miles from the Maisons; they are remarkable from their superior magnitude compared with other rocks in the neighbourhood and therefore of great service as a mark.

Le Figuier, is a rock always above water, lying N.W. by N. $1\frac{1}{4}$ miles from Maitresse île.

Red Frouquie is a rock of nearly the same size, height, and character as Le Figuier, situated about midway between it and Maitresse île.

Calfateurs, are four small rocks always uncovered, lying a cable eastward of Maitresse île, with which they are connected at low water.

Rocher du Sud, is a large rock always uncovered, lying S. by W. $\frac{3}{4}$ W. 4 cables from Maitresse île.

Grand Vascelin, N.W. by N. 3 miles from Maitresse île, uncovers 43 feet at the lowest tides. This is a large flat rock, with two heads always above water; very conspicuous from its size, and from its position makes a very useful mark. The Petite Vascelin bears N.E. by N., three-quarters of a mile from the Grand Vascelin, and lies close to the edge of the reef near deep water, but being 13 feet lower than the former rock is covered for a considerable period during spring tides.

Le Pipette Rocks are a group of considerable size situated at the north-western extreme of the elevated part of the Minquiers reef. The highest point of it (like the Grand Vascelin) uncovers 43 feet at the lowest tides. The outer rock of the group is called the Grand Haguet; it covers at high water, and bears N.W. nearly half a mile from the high head of Pipette; N.W., 5 miles from Maître île; W. $\frac{3}{4}$ N., $2\frac{1}{2}$ miles from the outer part of Petit Vascelin, and E. $\frac{3}{4}$ S. $2\frac{1}{2}$ miles from Grune du Nord Ouest.

St. Peter church-spire over the quarry at Le Fret point leads over the rock.

The above described rocks are all situated within the limits of the middle or elevated portion of the reef; to the westward of this part the most remarkable are Derée Anglaise, Grune du Nord Ouest, Brisants du Nord Ouest, Brisants du Sud and Derée Française. To the southward the danger line is marked by Le Four, La Souard and Les Sauvages. To the eastward are numerous sunken rocks extending nearly 6 miles from Maitresse île.

Derée Anglaise, a small cluster of rocks, the largest and highest whereof dries 27 feet at low water and lies N.W. by W. $\frac{3}{4}$ W. 2 miles from the Maisons, Maitresse île being on the same line of bearing.

There is a passage, having 3 fathoms at low water, between this rock and the Maisons ; but it lies very close to Derée, and is only half a mile wide ; a long string of rocks extend from the Maisons to the westward for $1\frac{1}{2}$ miles.

Grune du Nord Ouest lies on the extreme northern edge of the sunken part of the plateau of the Minquiers, W. $\frac{3}{4}$ N. $2\frac{1}{2}$ miles from the outer rock of Pipette group, and N.N.W. $1\frac{1}{2}$ miles from Derée Anglaise. This rock dries 5 feet at low water ; it is steep to the northward and eastward, but there are numerous sunken rocks to the southward and westward.

Brisants du Nord Ouest form the north-western extreme of the Minquiers reef, and are connected with the Grunes du Nord Ouest by a rocky ledge of sunken reef. The highest head of the Brisants dries 3 feet at low water, and lies with the Faucheur and Haute Grune in line S.E. $\frac{1}{4}$ E. Maitresse île may be seen (at an elevation of 30 feet) open N.E. of the Maisons the apparent breadth of the latter S.E. by E. $\frac{1}{2}$ E. Grune du Nord Ouest, E. $3\frac{3}{4}$ S. $1\frac{1}{2}$ miles ; the outer part of Pipette group, and outer part of Petit Vascelin being on the same line of bearing. St. Ouen church spire is also in line with La Moye signal-house N.E. by N. From this rock the sunken reefs extend to the westward for nearly a mile, having depths of one to 2 fathoms at low water.

Directions.—St. Ouen church-spire in line with La Moye quarries (marked by a white streak on the cliff outside of them) bearing N.E. $\frac{1}{2}$ N. leads three-quarters of a mile to the westward of all these dangers, and if the above line be preserved until the Minquiers light-ship bears S.S.E., a course shaped direct for her will clear the Brisants du Sud (the south-western salient of the Minquiers reef) by $1\frac{1}{4}$ miles.

Derée Française consists of two rocks which dry 6 feet at low water and lie nearly east and west, distant from each other a third of a mile. On the eastern rock Princes tower (Jersey) is seen touching the east side of Derée Anglaise N.E. $\frac{1}{4}$ E., and Maitresse île appears open southward of Les Faucheurs E. $\frac{1}{4}$ S.

Brisants du Sud lie S.W. $\frac{1}{2}$ W. distant $1\frac{1}{4}$ miles from Derée Française. They consist of a small clump of rocks with one and 2 fathoms over them at low water.

There is also another small patch of sunken reef situate a quarter of a mile to the W.N.W. of this. These are the outer dangers to the S.W., and from them the Minquiers light-ship bears S.S.W. $2\frac{2}{3}$ miles.

Le Four is the highest head of a small group lying on the southern edge of the Minquiers, and appears at half ebb ; it dries 18 feet at low water and lies with La Moye signal house in line with the middle Maison N. by E. $\frac{1}{4}$ E., and Chausey lighthouse in line with Corbière rock S.E. by E. $\frac{1}{2}$ E.

La Souarde, a group of low rocks lies on the southern edge of the Minquiers, E.S.E. nearly $2\frac{3}{4}$ miles from Le Four; on the highest head, which dries 9 feet at low water, the Corbière rock (Chausey) is in line with La Tour point S.E. $\frac{2}{3}$ S., and the Maisons are a little open westward of Les Faucheurs, N. by W. $\frac{3}{4}$ W.

Les Sauvages are a cluster of dangerous rocks, detached from the southern edge of the Minquiers reef and lying nearly 3 miles E.S.E. of La Souarde; they are three-quarters of a mile long E.S.E. and W.S.W. by one quarter of a mile broad, with 2 to 15 feet over them at low water.

From the 2 feet rock near the middle of the reef Chausey lighthouse is a little open northward of the Corbière S.E. by E. $\frac{1}{4}$ E. $7\frac{1}{2}$ miles, and La Moye signal-post (Jersey) is a little open westward of Maitresse île N. $\frac{1}{2}$ W. The town of Granville is wholly open southward of Guernsey. St. Peter church-spire in line with Maitresse île N. $\frac{1}{4}$ E. leads close to the westward of Les Sauvages. Granville church-spire open northward of Chausey castle S.E. by E. leads to the northward. Chausey castle open southward of Corbière rock E.S.E. leads to the southward, and Terqueti mill wholly in sight eastward of the high land of Meinga point S. by W. $\frac{1}{2}$ W. leads to the eastward, as will also Cancale church in line with Haut Bout mill S. $\frac{1}{4}$ W.

Le Cocq, lying S.E. by E. $\frac{1}{2}$ E., nearly $1\frac{3}{4}$ miles from Maitresse île, uncovers 16 feet at the lowest tides. On the rock the south extreme of Maitresse île and Les Maisons are in line N.W. by W. $\frac{1}{2}$ W. and Champenax is just in sight to the southward of Chausey island S.E. by S.

This rock is the outer and most important danger off Maitresse île to the south-eastward; the one next in importance on this side, called La Ronde, lies from Le Cocq N. by E. $\frac{1}{2}$ E. rather more than half a mile, and is awash at low water.

Le Faucheur uncovers 29 feet, and lies E. by N. one mile from Maitresse île.

Le Rat uncovers 12 feet, and lies N.E. $\frac{3}{4}$ E. $1\frac{1}{4}$ miles from Maitresse île.

Les Trois Grunes uncovers 35 feet, and lies N.E. by E., 4 cables from Maitresse île.

Grune de Turbot uncovers 12 feet, and lies N. by E., $\frac{1}{2}$ E. $1\frac{1}{4}$ miles from Maitresse île. From this the highest rock of the group, a number of low rocks extend in a northerly and also in a westerly direction, for a quarter of a mile.

Grune Gauvin uncovers 5 feet, and lies in the middle of a rocky clump of less height, and about a quarter of a mile in diameter. It is about a mile within the northern edge of the Minquiers reef, and N.N.E.

2 miles from Maitresse île. On the Grune St. Peter church-spire appears a little open of point de Bût, and in line with the eastern part of the town of St. Aubin beyond N. $\frac{1}{4}$ E.

Les Demies uncover 17 feet, and lie W. by N. $\frac{1}{4}$ N., nearly $1\frac{1}{2}$ miles from Grune Gauvin, and N. by W. $2\frac{3}{4}$ miles from Maitresse île. On the eastern rock St. Peter church-spire appears open eastward of Bergerie house; and Normant signal-post nearly half way to point de Bût, N. by E. A small reef, nearly awash at low water springs, lies E.S.E., nearly three-quarters of a mile from Les Demies.

The best passage into Maitresse île lies between this rock and Grune Gauvin.

Les Caux des Minquiers, extend from Le Rat rock in an easterly direction for $4\frac{1}{2}$ miles; the whole of this line is so thickly studded with rocks as to render the navigation amongst them at low water perilous even for boats; but as none of the rocks dry more than 7 feet at that period there is never less than 11 feet over them at half tide; during the upper stage of the tide therefore it is not at all uncommon for vessels of light draught to sail over them.

Turnabout Rock dries 4 feet at low water, and is the easternmost danger visible above the level of the sea at that period. On this rock Seymour tower appears within mont Orgueil, midway between it and Seymour house N. $\frac{3}{4}$ E., and Les Maisons and Le Figuier rocks in line W. $\frac{3}{4}$ N. A sunken reef extends from Turnabout rock to the eastward as far as—

East Danger, which may be considered as the eastern extreme of the Minquiers reef. This rock has only 3 feet over it at low water, and lies E. $\frac{1}{4}$ N., 6 miles from Maitresse île. On it Les Maisons are seen touching the north side of Le Figuier rock W. $\frac{3}{4}$ N., and Seymour tower appears about midway between the inner part of Mont Orgueil castle and St. Martin's church North, and Princes tower is in line with the east side of Grouville mill N. $\frac{1}{4}$ E.

Directions.—To clear the east extreme of the Minquiers reef, St. Martin church-spire and Seymour tower in line N. $\frac{1}{4}$ W., leads three-quarters of a mile to the eastward of the reef. St. Peter church-spire and Hermitage rock in line N.N.W. $\frac{1}{4}$ W. is a wider mark, clearing the reef by $1\frac{1}{2}$ miles. Chausey lighthouse in line with the beacon on Enseigne islet S. $\frac{1}{4}$ E., also leads to the eastward of the reef by 2 cables. Coutances cathedral well open to the northward of Agon church E. by S. $\frac{3}{4}$ S., leads three-quarters of a mile to the northward of Les Caux des Minquiers and all the foul ground extending from them. Outside, or to the eastward of East Danger, the soundings are tolerably regular, from 8 to 10 fathoms over gravelly bottom.

As stated before, St. Ouen church-spire and La Moye quarry bluff (appearing as a white streak just to the westward of La Moye signal-house) in line N.E. $\frac{1}{2}$ N., leads clear of the west extreme of the Minquiers reef by three-quarters of a mile. St. Ouen church, a little open west of the Corbière, leads 4 miles to the westward. Amas du Cap, midway between the light-house on cape Frehel and Tertre Morgan mill S. by W. $\frac{3}{4}$ W. leads $1\frac{1}{2}$ miles westward of the reef; and the Minquier light-ship bearing S.S.E., clears the south-west extreme by $1\frac{1}{4}$ miles. The south-west extreme of the reef may be cleared also at the distance of more than 2 miles by bringing Le Grand Larron semaphore in line with the east end of Cezembre island S. by E. $\frac{3}{4}$ E.

When navigating in the neighbourhood of the Minquiers the effect of the tidal stream on the vessel's course must be most carefully considered and allowed for.

From Jersey to the Southward, in rounding the west end of the Minquiers reef on the flood tide, in foggy weather or at night, a berth should be given to it of at least 3 or 4 miles, and should a depth of anything less than 16 or 17 fathoms be obtained, at once haul out to the westward.

The northern edge of the reef is steep, and as the first part of the flood sets strongly over it, no vessel should risk a near approach until after 4 hours flood; from which period the stream setting along and off the reef is no longer dangerous. During the dangerous period of the tide, however, Pipette rock is always visible, as well as other rocks to the eastward of it; and the sunken rocks to the westward throw up strong ripples.

To round the east end of the reef. After clearing the dangers near St. Helier, bring St. Peter church-spire a little open westward of the Hermitage N.N.W. and pass to the eastward of Icho bank; when St. Martin's church-spire comes in line with Seymour tower, N. $\frac{1}{2}$ W., run on that line to clear the east extreme of the Minquiers, off which a vessel will be when Maitresse île bears West: when the latter bears W. $\frac{1}{2}$ N., or W. by N., haul to the westward, and pass between the Minquiers and Western Ardentes, or to the eastward to clear the Ardentes. In the latter case bring L'Etat rock (Chausey) in line with Pointe de Champeaux S. by E. $\frac{1}{2}$ E., or by a bearing of Chausey, if these latter cannot be seen. In the former case, bring the beacon on L'Enseigne rock (Chausey) a little open eastward of the beacon on Grande Ile, and pass between the Ardentes. The Maisons and Maitresse île in line will pass midway between the Ardentes.

The northern and western sides of the Chausey group are steep, and may be safely approached to the distance of half a mile. There is,

however, a $3\frac{1}{2}$ -fathom bank at the distance of a mile from the western shore, having a 5-fathom channel inside of it. When the Corbière rock (at the west end of Chausey) bears South you will be on the line of the Western Ardentes rock, after which round the west end of Chausey at the distance of 2 miles, and proceed as necessary.

At half-tide and above, nothing less than 11 feet will be had over the Caux des Minquiers. At such times and in moderate weather light draught vessels may safely pass over them, provided they do not venture to the westward of a line drawn through Icho and Princes towers.

Tides.—It is high water, full and change, at the Minquiers at 6h. 6m.; springs rise 35 feet, neaps 26 feet.

LES ARDENTES lie $7\frac{1}{2}$ miles E.S.E. from Maitresse ile, and $3\frac{1}{2}$ miles northward of the Chausey group; they consist of two small banks of sand, shells, and stones, each having also a few rocky heads which dry 6 feet at low water. The banks lie half a mile apart, on an E.S.E. and W.N.W. bearing from each other and are steep to all round. The marks for the southernmost rocky head are Granville lighthouse in line with south side of Petite Canue, or the Etat (Chausey); or Granville church three times its own length open southward of the Canue S.E. by S., and the high land of La Tour point (Chausey) wholly open to the eastward of L'Enseigne beacon South. A red buoy is moored off the south-east extreme of the eastern bank.

Western Ardentes, situated about three-quarters of a mile to the S.W. of Les Ardentes, is a bank of much the same character as them, having generally 15 to 18 feet over it, excepting on a rock near its west extreme, on which there is but 5 feet at low water. This spot bears North nearly $3\frac{1}{2}$ miles from the Rondes de L'Ouest, situated at the north-western extreme of the Chausey group; and from the same rock mont St. Michel is in sight to the eastward of La Tour point S. by E. $\frac{3}{4}$ E. The remarkable trees on Mount Huchon are nearly in line with Agon church E. $\frac{1}{4}$ N., and Princes tower (Jersey) appears a little open eastward of Grouville mill North.

Nearly midway between the Les Ardentes and the eastern extreme of the Minquiers there is another rocky ledge, with $3\frac{1}{2}$ fathoms over it. Between the Ardentes and the Chausey isles there is a good sound channel with 7 and 8 fathoms through it; great care is, however, required in the navigation, from the great strength of the tidal stream in it.

Anchorage is good near the middle of the channel; care must be taken, however, to anchor out of the line of tide of any of the dangers, during the strength of the stream, in case of drifting.

ÎLES CHAUSEY are an extensive group of little islets and rocks, of different heights and dimensions, occupying a space of nearly 16 square

miles. The principal and largest islet, named Grande-Ile Causey, is on the southern side of the group, and lies S. $\frac{1}{4}$ E. about 19 miles from La Roque point (Jersey), and S.E. $\frac{3}{4}$ S. 11 miles from Maîtresse île (Minquiers). It is about a mile long N.N.W. and S.S.E., and one third of a mile broad, the projecting points being topped by hills, and near its centre, which is rather elevated, is some cultivated land.*

The buildings on the islet are, the lighthouse on La Tour point, a church erected in 1853, the ruins of an old fort, a stone beacon 33 feet high on Gros Mont, a farm, several cottages, in which about 200 stone-cutters reside, and two or three small blacksmiths' shops. There are several quarries of granite, a large quantity of which is sent to France. Longue islet, lying 6 cables to the eastward of the lighthouse, is extremely useful as a mark in rounding the south-west part of the group. On Meule islet, lying N.W. $1\frac{1}{2}$ miles from the lighthouse, are the ruins of a convent and a well of good water.

This group, although dangerous and intricate to navigate, is bold-to on the north and west sides, but the south side should be approached with caution at low water, at which time of tide the eastern side is quite inaccessible to vessels of heavy draught, on account of the sand-banks which nearly bar the channel between it and Granville.

The anchorage generally resorted to by vessels of war is in Port Marie road, off the south side of Grand Ile. There are several Havres within, among the rocks, completely sheltered from all winds; the principal one, Causey Sound, is formed between Grande Ile to the westward and the Puceau rock to the eastward; it is, however, very narrow, as well as difficult of access, and only frequented by fishermen, vrachers, and stone boats capable of taking the ground.

LIGHT.—A square lighthouse, 56 feet high, stands on the summit of the hill which crowns La Tour point, the south-east extreme of Grande Ile, and exhibits a *fixed* white light, which is varied every *four minutes* by a *red flash*, the eclipses of which do not appear total in ordinary weather within the distance of 6 miles. This light, which is of the third order and elevated 121 feet above high water, may be seen in clear weather 15 miles, and renders the approach to the Causey islets easy at night; the lighthouse, when in line with the Corbière rock, S.E. by E. $\frac{1}{2}$ E., shows the precise limits of the south-east part of the Minquiers ledge.

La Corbière is a high remarkable rock lying at the south-west extreme of the Causey group, N.W. by W. $\frac{3}{4}$ W. $1\frac{6}{10}$ miles from the lighthouse, about half a mile to the south-west of Meule islet. The western part of the group contains 15 or 16 islets and numerous rocks.

* See Admiralty plan of isles Causey, No. 63; scale, $m=5$ inches.

only 7 feet water over them at the lowest tides, and bear N. by E. and S. by W. from each other, distant about 50 yards apart. The easternmost head has 11 feet over it, and lies E. by S. $\frac{1}{4}$ S. half a cable from the westernmost patch.

Basse des Epiettes.—This small patch, half a cable long N.N.W. and S.S.E., has two small rocky heads on it with only three feet water over them. The beacon on the Ensigne in line with the eastern slope of Grand Ile, N. $\frac{1}{2}$ W., leads between the Basse des Epiettes and the Tour patches.

Basse de l'Ile Longue is a rocky head with only 3 feet on it at the lowest tides, lying S. by W., 4 cables from Longue isle, and S.E. easterly, about three-quarters of a mile from La Tour point. It bounds the south-eastern limit of the S.E. anchorage of Causey; and the marks for it are, the Conchée touching the south end of the easternmost Huguenan, East, and the north and south heads of the Epiettes in one, N.N.W. $\frac{1}{4}$ W.

Fis-Cous and Basses du Fis-Cous.—Midway between Longue isle and the Huguenans are two rocky patches, named Fis-Cous and Basses du Fis-Cous, which may be dangerous to a vessel when working along this side of the Causey group.

The Fis-Cous is about 50 yards in extent, and uncovers 9 feet at the lowest tides, and is marked by a floating beacon. It lies S.E. by E. $6\frac{1}{4}$ cables from the south end of Longue isle; W. $\frac{1}{2}$ N. 7 cables from the Chapelle rock; and S.W. $\frac{3}{4}$ W. 3 cables from the Grand Cheval rock. A small rock, awash at the same period, lies a cable to the eastward of the Fis-Cous.

The Basses du Fis Cous are about a cable in extent, and lie W.N.W. a cable from the Fis-Cous. One head of this danger is awash at the lowest tides, and there are others with one to 4 feet over them at the same time. The stone beacon on Gros Mont in line with Tourette rock (the mark for the South-East Channel into Causey Sound), N.W. $\frac{1}{4}$ W. leads south-west of the Fis-Cous and the Basses du Fis-Cous.

Iles des Huguenans are small islets lying on the southern edge of the Causey group, 2 miles to the eastward of the lighthouse, and form, with a few rocks which join them at low water, a small rocky cluster, 4 cables long E.N.E. and W.S.W. They may be easily recognised, and on the summit of the largest islet is a stone pillar, which, when in line with a similar pillar on the Etat rock, N.N.E., show the western limit of the fishing grounds. The summit of the largest islet is covered with grass, and sheep are often sent there from Granville to graze.

La Conchée.—This rock lies half a mile to the eastward of the Huguenans, on the eastern side of the Conchée passage, and its summit is about 20 feet above high-water great springs.

Haute Foraine.—This rock, $\frac{1}{2}$ N., a long mile from the Conchée, is the easternmost of the rocks connected with the Chausey group. Its advanced position, and the fact that it is very conspicuous, and the Granville pilots have no doubt of its position at all tides. It uncovers 28½ feet at the lowest tides, and there are from 15 to 16 feet water at the ordinary tides.

Le Tomin is a conspicuous rock lying one quarter of a mile to the northward of the Haute Foraine, a little to the northward of the line on which the rocks are connected with the north point of the large Huguenan. If you are bound to the northward, I will pass a safe distance to the southward of the Haute Foraine, by keeping the summit of the Conchée in sight, and then I will pass W. by N. by N. $\frac{1}{2}$ N.

Le Pignon, an isolated dangerous rock lying N.E. $\frac{1}{2}$ N., rather more than half a mile from the summit of the Haute Foraine, uncovers 10 feet at the lowest tides, and does not show in ordinary neaps. A cable south-east of this rock there is a flat, with only 2 feet water. A sand-bank also, with 9 feet on it, lies 3 cables to the north-east of the Haute Foraine.

Le Founet, the easternmost rock of the Chausey group, uncovers 7 feet at the lowest tides, and the marks for it are, the Canue and Etat in one, or nearly so, N.W. $\frac{1}{2}$ N.; Contances cathedral its own breadth open eastward of Mont Martin mill, E.N.E.; and the top of the Conchée perceptibly open southward of the little hillock which crowns the south point of the large Huguenan bearing W. $\frac{1}{2}$ S. This danger is marked on its S.E. side by a red bell buoy.

Basse du Founet, an isolated rocky patch, on which there are only 3½ feet at the lowest tides, lies N.E. $\frac{1}{2}$ N. 1½ cables from the Founet, and between it and the Pignon there are patches of from 10 to 14 feet. The summit of the Conchée in one with the stone pillar on the large Huguenan leads to the southward of the Founet; and the Etat kept twice its apparent breadth to the northward of the summit of the Canue leads to the northward of the Basse du Founet.

The Chausey pilots take vessels, even at low-water springs, between the Founet and the Pignon, but strangers can only use this passage at low-water neaps, or at 2 hours dead at the springs, and should not attempt it when the Haute Foraine is covered.

La Canue.—This rock, called also Grande Canue, never wholly covers; it lies E. by N. $\frac{1}{2}$ N. 3½ cables from Chausey lighthouse, and its summit is 6 feet above the level of the low water.

L'Etat, called also the Etat de la Canue, is a rock lying on the northern edge of the low water, and is marked by a stone pillar, similar to the one on the large Huguenan. This pillar which stands in the sea, N.W. $\frac{1}{2}$ N. 1½ cables from the Canue, is intended to

show the western limit of the fishing grounds, and are likewise of great use as marks to lead between the Marié ledge and the Catheue reef.

L'Enseigne, a small islet about 8 feet above the level of high water great springs, lies 2 miles to the northward of La Tour point, and is remarkable by the uniform convexity of its surface, as well as by a small stone beacon erected on its summit.

Les Rondes de la Déchirée, a rocky ridge situated on the north-west side of the Chausey group, is 3 cables long in a N.E. and S.W. direction, and the northernmost head on it uncovers 39 feet, and the highest head, which is nearly in the middle of the ridge, uncovers 45 feet at the lowest tides. There are several other low heads on the ridge; the one which lies at its south extreme uncovers only 4 feet, and the marks for it are, the north-west point of the Pointu touching the south-east extreme of the Déchirée, E. by N.; and the lighthouse in line with the Chapeau, S.S.E. $\frac{1}{2}$ E.

Basse du Chenal.—This small rocky patch, lying exactly in the fairway of the entrance to Les Rondes anchorage, about three-quarters of a cable northward of the north extreme of the Rondes l'Ouest, has only 5 feet over it. The marks for it are, the Pointue just open southward of the Déchirée, E. by N.; and the lighthouse a little open to the south-west of Gros Mont, S.S.E. $\frac{3}{4}$ E.

Les Rondes de l'Ouest is a rocky ridge, 6 cables long N.N.E. and S.S.W., and 2 cables broad, forming the western extreme of the Chausey group. Several of the heads on the ridge never cover, and serve as marks for the south-west extreme of the group.

SOUND de CHAUSEY, so called from the secure anchorage it affords to vessels of light draught, trends nearly N.N.W. and S.S.E. along the eastern side of the Grande Ile, and occupies a space 6 cables long from abreast La Tour point, to the eastward of the stone beacon erected on the summit of Gros Mont. At low-water springs it is surrounded by rocks, and by banks of sand and mud, which form a natural harbour, where vessels constructed to take the ground will find capital shelter. If intending, however, to remain longer than one tide, or at the springs, they must moor head and stern, to prevent tailing on the banks. The Sound is sheltered on all sides except from S.S.E. to E.S.E., and strong winds from that quarter throw in a heavy sea at high water. Fresh winds from N.N.E. to N.W. are also much felt, and cause a heavy swell throughout the whole extent of the Sound from one hour before till two hours after high water.

Although the deepest parts of this Sound do not dry, there remains but little water in them, and the soundings are very irregular. There are, however, two narrow gullies in which three or four short vessels, drawing from 10 to 11 feet, may remain afloat at low water. The largest, at the

The first is a narrow channel, from 25 to 55 yards broad, and from 10 to 15 feet deep. The second, which is very narrow, is a channel from 10 to 15 feet, as a little more to the southward, and is a continuation of the first, and the new channel, and is a continuation of the first, which measures 24 feet at the lowest tide. A third channel, which is in the lowest part of the beach, between the first and the second, where the bottom is soft mud, and vessels may go in at low water.

Directions.—There are two channels leading to Chansey Sound, the first is a narrow channel between La Tour point and Longue Isle, and the second is a narrow channel between the Esmeralda and the Esardière. The first channel, which is a continuation of its simplicity, is divided into two channels, the South and the North, by the Epinettes, but neither of them are good at low water. The South channel, between the point and the Esmeralda, is a continuation of the first, drawing 10 feet as soon as the Tonneau rock, which lies a little to the south-east of the point and dries 12 feet at the lowest spring, is covered, there will also be 12 feet in mid-channel at low water.

In making the channel, being the white stone pillar, erected on the Esmeralda, a sign, eastward of the edge on the eastern side of Grande Ile (the highest point, N. by W. which will lead between the Epinettes point and the rocks extending from the point. The beacon on the rock which forms the southwest point of the Epinettes may then be approached to within half a cable, then steer to the northward in mid-channel, parallel to the shore of the Esmeralda, and if intending to run to the northward of the Crabtree, pass to the eastward of it, giving it a berth of at least 30 or 40 yards, as a tall run out from it in that direction.

The leading mark for the South-East channel is the beacon on Gros Mont in line with the Tourrette rock, which is the name given to a short steep point on the beach, a cable north-eastward of the farm), bearing N.W. $\frac{1}{4}$ W. When passing Longue Isle, open the beacon its breadth to the westward of the Tourrette, to clear the ledge extending off the south end of that Isle, taking care, however, after passing it, to bring them quickly in one, which mark will lead between the Loup and the Ebauché ridge (both of which have beacons on them, the first on its north-west point, to be left on the port hand, and the other on the south point of the ridge, to be left on the starboard hand), over a bank of mud and to the northward of the Epinettes, when either anchor or proceed as if coming through the South channel. This mud bank, which completely bars the channel, dries at low-water springs, and cannot be crossed by vessels above 10 feet draught till at least $2\frac{1}{2}$ hours flood; when the highest head of the Loup covers there are 16 feet water on the bank.

The Northwest Entrance into Sound de Chausey is northward of the Enseigne, between the rocks extending 2 cables eastward of Pointue rock and the Grande Entrée; this latter is a small group of rocks, the highest head of which uncovers 38 feet, lying $3\frac{1}{4}$ cables to the eastward of the low heads extending to the eastward of the Pointue. The highest head of the Pointue uncovers $41\frac{1}{2}$ feet. The greater part of the rocks bounding this channel into the Sound are marked with beacons which, with strict attention to the following directions, will render it, to persons locally acquainted with the Chausey group, easy of access between the periods of half-flood and half-ebb for a vessel drawing not more than 10 feet; no stranger should, however, attempt so intricate and contracted a navigation.

The channel from the above entrance continues in a southerly direction between the western edge of a rocky group named the Longues, and a flat rock, which uncovers 8 feet and lies a cable to the eastward of the Etardière, to which it is joined at low water springs by a sand-bank; these rocks are only 2 cables apart. From thence the channel takes a W.S.W. direction between the Etardière, which never covers, and the Enseigne; and then a southerly direction, passing to the westward of the low rocks extending to the south-west of the Petite Enseigne, the Saunière, a small islet 57 feet above the lowest tides, and the Petite Fourche, and to the eastward of the Massue, and a rocky group situated to the eastward of the Vieux: and thence to the Sound. A rock, with a beacon on it, lies off the north end of the Petite Fourche, exactly in the fairway, and a vessel can pass either between it and the Petite Fourche, or to the south-west between it and the group lying to the eastward of the Vieux.

In entering the North-west channel into Chausey Sound keep the lighthouse touching the north-east slope of the Enseigne bearing S. $\frac{1}{2}$ E. passing to the eastward of the low rocks extending to the eastward of the Pointue. When to the southward of the Pointue, bring the lighthouse in line with the south-west slope of the Enseigne, to run between the Longues and the above 8-feet flat rock. When the two white patches on the Massue and the Chapeau rocks are in one, or the south end of Meule islet is just touching the north end of the Massue, S.W. $\frac{1}{4}$ W., run in that direction until the lighthouse is in line with the south-west point of the Saunière islet, S. by E. $\frac{1}{4}$ E., which will lead to the westward of the latter rock, and after passing it steer in mid-channel between the beacons.

L'Enseigne Anchorage is a contracted space where small vessels drawing not more than 10 feet water, and under the guidance of good pilots, may find shelter from S.W., Southerly, or S.E. winds. With northerly winds no vessel should anchor there, except to await water through the North-west channel into Chausey Sound, as from its limited

except there is no room to veer or drive, without tacking on the sand-bank, which at low water dries 1½ cables to the northward of the Enseigne.

When running for this anchorage through the north-west entrance to Chausey sound keep the lighthouse touching the north-east slope of the Enseigne bearing S. ½ E. until the vessel is to the southward of the Pointue; then bring the lighthouse in line with the south-west slope, and when the south end of Meule islet touches the north end of the Macue rock, anchor, and the vessel will be in the middle of the anchorage and in the deepest water, 22 to 36 feet, sandy bottom, midway between the flat rock lying to the eastward of the Etardiere and the Longues. Great care must be taken between the periods of half-ebb and half-flood, to calculate the height of the tide, as the soundings, when to the southward of the Pointue, vary from 7 to 22 feet at low water, and also to avoid a small rock with only 4 feet on it lying nearly in the fairway of the entrance.

PORT MARIE is a little bay, formed between La Tour and Bretagne points, in front of which, 2 cables off shore, there is a small space capable of affording shelter from winds between N.W., round northerly, to N.E., to two or three vessels of not more than 10 feet draught.

Directions.—The anchorage off port Marie, which is not more than 3 cables in extent, lies between the Bretagne rocks and the Tour patches, and to enter it from the south-west bring the beacon on the Etat rock in line with La Tour point, N.E. by E. easterly; or to the northernmost and highest head of the Epiettes quite shut in, leads to the south-east of the Bretagne rocks and to the north-west of the Tour patches, over the Château patch, and when the beacon on the Huguenan is in line with the Grand Cheval, E. ¾ S., anchor in a depth varying from 15 to 22 feet at low water over a sandy bottom.

To enter from the south-east, bring the westernmost point of Grand Ile, forming port Homard, to touch Bretagne point N.N.W. ½ W., and it will lead to the south-west of the Tour patches, and to the north east of the Chateau patch and Bretagne rocks, and when the northernmost head of the Epiettes is shut in with La Tour point, anchor.

Anchorage.—Port Marie road is an excellent anchorage for large vessels of war, and is in reality the principal roadstead of Granville; for the greater part of the shipping bound there remain at anchor in it until the water on the banks is sufficiently high for them to proceed.

The best position for a vessel of large draught to anchor in this road is with the lighthouse bearing N. by W. ¼ W. and distant from the shore a mile, or half a mile, in 7 or 8 fathoms or more according to the direction of the wind and the vessels' draught. When at anchor, Coutances cathedral should appear in sight northward of the largest Huguenans, E. by N. ½ N.,

and the Enseigne should be seen to the eastward of La Tour point. She will here be sheltered from the wind, if to the northward of N.W. by N. by the rocks forming the south-west part of the Chausey group; and should it be inclined to draw more westerly with an appearance of bad weather, the first opportunity must be taken of weighing and getting to windward with the ebb, or run either into Cancale road, where good shelter will be found under the Herpin rock, or to the eastward and northward of the Chausey group, as the wind may make it necessary.

La Conchée Anchorage.—With the wind from N.W. by W. to N.N.E. the Conchée anchorage is to be preferred; the mark for which is the old castle in ruins on Grande Ile in line with the Huguenan beacon W.N.W., and the Sellière and Culassière rocks in line N.N.W. $\frac{3}{4}$ W., in 5 fathoms at low water.

L'Etat Anchorage.—With the wind to the southward of West, the anchorage under the Etat rock should be resorted to; anchor with the lighthouse in line with the Canue, or with the beacon on the Etat, according to the direction of the wind, at half or three-quarters of a mile from the rocks, in 5 to 7 fathoms. Indeed, all the northern shore of the Chausey group affords shelter against southerly and south-westerly winds and is bold and may be approached without fear.

Les RONDES de l'OUEST ANCHORAGE, situated on the west side of the Chausey group, under the Rondes de l'Ouest ridge, is the only shelter the group affords to large vessels during easterly winds. It can be reached at any time of tide, either from port Marie road, or from the Conchée or the Etat anchorages. When proceeding towards it from port Marie road, keep the Huguenan beacon in one with the highest rock of the Piliers, East, to pass to the southward of the Château patch, and when Gros Mont bears N.E. $\frac{1}{2}$ N. haul gradually in, but not farther than to have the middle of Longue isle in line with La Tour point, E. $\frac{1}{4}$ S. to avoid the Cancalais.

When the Ronde de l'Ouest, a large remarkable round rock, is in sight westward of the Corbière, N. by W., haul in to within a quarter of a mile of the rocks, passing between Corbière bank and the Chausey group. When the lighthouse is midway between Gros Mont and the west extreme of Grande Ile, or touching the south end of Meule islet, S.E. $\frac{1}{4}$ E., and the Etat beacon is about midway between the Enseigne and the Grande Entrée, E. $\frac{3}{4}$ S., anchor in from 7 to 9 fathoms over sandy bottom, half a mile to the westward of the Rondes de l'Ouest and the same distance to the north-east of the Corbière bank.

BEAUCHAMP ANCHORAGE lies about one quarter of a mile to the north-west of the Huguenans, and in case of need might be used

dry from 3 to 7 feet above the lowest tides. The entrance is between the Gaillard d'Avant rock, which uncovers 30 feet, and some small heads which lie close to the south-west of the Conchée and uncover $17\frac{1}{2}$ feet.

The leading mark through is, the Sellière and Petite Mauvaise rocks in one N.N.W., until the lighthouse comes in line with the middle of the Ango rock; then haul to the westward and cross the mud-bank, which extends to the northward from the Huguenans, to the anchorage. When the small heads lying close to the south-west of the Conchée cover, or the Artimon rock, which lies a little to the north-east of the Gaillard d'Avant and uncovers 19 feet, there will not be less than 10 or 11 feet on any part of the mud-bank, which must be crossed by a vessel running for the anchorage.

ANCHORAGE between Les RONDES de L'OUEST and La DÉCHIRÉE.—This anchorage, which is similar to that of the Enseigne, is situated on the north-west side of the Chausey group, and affords partial shelter from South, round easterly, to N.E. It is about 3 cables long and 2 cables wide, and has a depth varying from 22 to 40 feet, sandy bottom. The entrance is $1\frac{1}{2}$ cables wide, E. by N. $\frac{3}{4}$ N. and W. by S. $\frac{3}{4}$ S., between a small rock with only 5 feet over it at the lowest tides, named Basse du Chenal, and a rock which uncovers 4 feet, and forms the south-west extreme of the Rondes de la Déchirée. The leading mark in, is the lighthouse in line with the beacon on Gros Mont, S.S.E. $\frac{3}{4}$ E., and when the Pointue is midway between the Déchirée and the Grande Entrée, the vessel will be as near as possible in the middle of the anchorage.

There is an anchorage, called La Déchirée, to the eastward of the above, entirely surrounded by high rocks which do not cover until the last quarter flood, forming between the periods of half-ebb and half-flood, a natural harbour, accessible at all tides, but no vessel should use it in changeable or boisterous weather, or without a good local pilot, as it is not more than half a mile long and 3 cables wide, the broadest part being between the Déchirée and a rock to the southward which uncovers 24 feet.

To enter this anchorage, proceed as before, with the lighthouse in line with the beacon, S.S.E. $\frac{3}{4}$ E., and when the Pointue is half its apparent breadth open to the southward of the Déchirée, E. by N., the vessel will be to the southward of the south-west extreme of the Rondes de la Déchirée, and should haul to the eastward, taking care to steer sufficiently to the northward to avoid two rocky patches which lie on the south side of the anchorage, and are awash at low-water springs. When the lighthouse is in one with Massue rock, S. by E. $\frac{3}{4}$ E., anchor in from 4 to 5 fathoms water, over rather coarse ground. The Enseigne anchorage and the north-west channel into Chausey sound is often entered by this route

as a shelter, at the springs, for one or two vessels of large draught when under the guidance of good pilots. It consists of a kind of basin or deep about 3 cables long, north and south, 2 cables wide, with a depth of 5 to 6 fathoms in it at low-water springs, over excellent holding ground, extending from the line on which the lighthouse is in line with the south extreme of the Ango rock, to that on which the beacon on Gros Mont is in line with the northern hillock on the islet called Grande Ancre or Saddle island. It is sheltered at low-water springs by the rocks and the surrounding sand and mud-banks, and it is also tolerably well protected at the neaps; but at high water during the springs, fresh winds from N.W., round northerly, to N.E., cause a heavy tumbling sea, which, however, soon subsides as the tide falls.

The usual moorings are laid down N.N.E. and S.S.W., but if intending to remain, the vessel should be secured with anchors on each bow and quarter. The French steam-vessels employed in the oyster fishery have moorings laid down for their use. Vessels of small tonnage, light draught, a fair wind, and under the care of experienced pilots, may enter the Beauchamp anchorage from the southward at all times of tide by passing between the Grand Piliers rock and the Tournioure rock the latter having a beacon on it,* or between the Tournioure rock and the Chapelle rock; but these narrow passages could not be used without sufficient wind to stem the streams.

Passé Orientale de l'Etat.—The Beauchamp anchorage can also be reached by running through this passage, which is a clear space formed among the rocks on the north-east part of the Chausey group; the tide must, however, be sufficiently high for a vessel to cross the sand-bank, which extends over the greater part of the passage, and dries from 2 to 5 feet above the level of the lowest tides.

The entrance to this passage, $1\frac{1}{2}$ cables wide, lies between the Pouillou rock, which uncovers 32 feet, and some small rocky heads which are connected with the Petit Etat, and uncover from 5 to 10 feet. From thence the passage is bounded on the west side by the Caniard du Sud, which uncovers 38 feet and by the Mauvaise, which is always above water; and on the east side by a small rocky group named Plate du Hibou, the highest head of which uncovers $26\frac{1}{2}$ feet, and by the Culassière rock which is never covered. The leading mark through is, Petite Ancre islet in line with the Mauvaise, S.W. $\frac{3}{4}$ W., until within about $1\frac{1}{2}$ cables of the latter, then steer to the southward, to pass between it and the Culassière, and thence to the anchorage.

Passé de la Conchée lies between the Huguenans and the Conchée rocks, and thence to the north-west between two mud-banks, which

* This beacon in December 1876 had disappeared.

dry from 3 to 7 feet above the lowest tides. The entrance is between the Gaillard d'Avant rock, which uncovers 30 feet, and some small heads which lie close to the south-west of the Conchée and uncover $17\frac{1}{2}$ feet.

The leading mark through is, the Sellière and Petite Mauvaise rocks in one N.N.W., until the lighthouse comes in line with the middle of the Ango rock; then haul to the westward and cross the mud-bank, which extends to the northward from the Huguenans, to the anchorage. When the small heads lying close to the south-west of the Conchée cover, or the Artimon rock, which lies a little to the north-east of the Gaillard d'Avant and uncovers 19 feet, there will not be less than 10 or 11 feet on any part of the mud-bank, which must be crossed by a vessel running for the anchorage.

ANCHORAGE between Les RONDES de L'OUEST and La DECHIRÉE.—This anchorage, which is similar to that of the Enseigne, is situated on the north-west side of the Causey group, and affords partial shelter from South, round easterly, to N.E. It is about 3 cables long and 2 cables wide, and has a depth varying from 22 to 40 feet, sandy bottom. The entrance is $1\frac{1}{2}$ cables wide, E. by N. $\frac{3}{4}$ N. and W. by S. $\frac{3}{4}$ S., between a small rock with only 5 feet over it at the lowest tides, named Basse du Chenal, and a rock which uncovers 4 feet, and forms the south-west extreme of the Rondes de la Déchirée. The leading mark in, is the lighthouse in line with the beacon on Gros Mont, S.S.E. $\frac{3}{4}$ E., and when the Pointue is midway between the Déchirée and the Grande Entrée, the vessel will be as near as possible in the middle of the anchorage.

There is an anchorage, called La Déchirée, to the eastward of the above, entirely surrounded by high rocks which do not cover until the last quarter flood, forming between the periods of half-ebb and half-flood, a natural harbour, accessible at all tides, but no vessel should use it in changeable or boisterous weather, or without a good local pilot, as it is not more than half a mile long and 3 cables wide, the broadest part being between the Déchirée and a rock to the southward which uncovers 24 feet.

To enter this anchorage, proceed as before, with the lighthouse in line with the beacon, S.S.E. $\frac{3}{4}$ E., and when the Pointue is half its apparent breadth open to the southward of the Déchirée, E. by N., the vessel will be to the southward of the south-west extreme of the Rondes de la Déchirée, and should haul to the eastward, taking care to steer sufficiently to the northward to avoid two rocky patches which lie on the south side of the anchorage, and are awash at low-water springs. When the lighthouse is in one with Massue rock, S. by E. $\frac{3}{4}$ E., anchor in from 4 to 5 fathoms water, over rather coarse ground. The Enseigne anchorage and the north-west channel into Causey sound is often entered by this route

9-10-68

44-38861-2137

1. State : _____

1. The following information is being furnished to you for your information:

... .. of the

1,600 FT. The Bonquet rock is marked by a circular lighthouse from

1. Lighthouse. The lighthouse rock is marked by a circular lighthouse from which at an elevation of 50 feet above high water, is exhibited a *fixed red* light, visible in clear weather 10 miles.

Les Nattes form a small rocky group, about 2 cables long N.W. and S.E., at the south-west extreme of the ridge extending from the Senequet, and are the most western rocks which uncover in the vicinity of the shore between the harbours of St. Germain and Régneville. They lie W. by N. $3\frac{1}{2}$ miles from the entrance of Blainville harbour, S.W. $\frac{3}{4}$ W. $2\frac{1}{4}$ miles from the Senequet, and the marks for the highest head, which uncovers $1\frac{1}{2}$ feet at the lowest tides, are Senequet lighthouse a little open to the eastward of Pirou church-steeple, N.E. $\frac{3}{4}$ E., and Coutances steeples in line with the houses of Courtaiville village (built on a remarkable mound), S.E. b. E. $\frac{3}{4}$ E. A vessel will pass to the westward of the west extreme of this group, when bound to the southward, by keeping Pirou steeple well open to the westward of the tower on the Senequet. This extreme bears S. $\frac{3}{4}$ W. $19\frac{1}{2}$ miles from cape Carteret lighthouse, but it is only in very clear weather that the light can be seen so far to the southward.

There are several small ridges of rock, uncovering from 3 to 5 feet at low-water springs, and forming a chain a mile in length, which extends from the Nattes to the north-east as far as the beach, and rejoins the outer sunken rocks of the Senequet ridge. A heavy sea runs on all these rocks when it blows hard from the westward.

A bell buoy painted red with staff and reflector, is moored in 6 feet water, on the west side of Les Nattes rocks.

At $1\frac{1}{4}$ miles S. W. by W. from Les Nattes rocks, lies the International buoy F. painted in red and white horizontal bands.

HAVRE de BLAINVILLE is situated about $3\frac{1}{4}$ miles S.W. by S. of Geffosse harbour (page 332), nearly midway between that harbour and Régneville. It is a kind of lagoon almost entirely filled with sand, and can only afford shelter to fishing boats at the springs.

A buoy with alternate red and black bands, lies in the entrance to Havre de Blainville; there is also a beacon near the entrance consisting of a mast surmounted by a ball and painted red.

ROCHES d'AGON are a small group lying $3\frac{1}{4}$ miles from the shore, and N.W. $\frac{1}{4}$ N. $1\frac{1}{2}$ miles from the highest head of the Ronquet, with a depth of 8 to 10 feet close to them. They form, with a bed of rocks on the beach, a continuous ridge, extending in a west direction from Agon steeple, and parallel to the Ronquet and the Moulières d'Agon rocks. The highest head of the Agon rocks uncovers 8 feet at the lowest tides; W.S.W. $4\frac{1}{2}$ cables from it there is another head which uncovers 6 feet; and at a quarter of a mile to the westward of the latter head is another, which uncovers 2 feet and lies N.W. $\frac{1}{4}$ N. $1\frac{1}{2}$ miles from the high head of the Ronquet, and S. $\frac{1}{2}$ W. 3 miles from the westernmost head of the Nattes.

There are no available marks on the shore for the western head of the Agon rocks, which are extremely dangerous to approach between half ebb

and half flood, and a heavy sea runs on them when it blows hard from the westward, but by keeping Hatainville sand-hills shut in with cape Carteret, N. by E., or the bluff point, 6 miles to the southward of Granville, named Bec de Champeaux or Champeaux point, in sight to the westward of pointe du Roc, S. $\frac{1}{4}$ W., it will lead to the westward.

Le RONQUET lying W. by N. $\frac{1}{4}$ N. $2\frac{1}{2}$ miles from the south point of the entrance of Régneville Harbour, is the highest rock of a group a mile long, east and west, and half a mile wide. This rock uncovers 20 feet at the lowest tides, and it may be useful to the mariner to know that when it covers, which is at about half flood, the stream in the offing turns to the north-east, and at half ebb, when it is awash, the stream turns and sets to the south-west. It may be easily recognized, when uncovered, by its position, and by its being the first rock that shows itself in a radius of 3 miles from the entrance of Régneville harbour.

The next highest head, forming the southern part of the group, uncovers 12 feet, and lies S. by W. half a mile from the Ronquet, with Grimouville church-steeple a little open to the northward of Coutances cathedral bearing east, a little northerly; and Mont Martin windmill in line with a guard house on the shore, S.E. by E. $\frac{3}{4}$ E. The latter mark also shows the direction of the western point of the group, which is three quarters of a mile to the westward of the Ronquet, and is terminated by a rock uncovering 5 feet. The whole of this group is very dangerous when covered, as there are no marks that can be understood, except by the local pilots, to point out the position of its western edge, which is $2\frac{3}{4}$ miles off shore, and bears S.E. $\frac{1}{4}$ E. $6\frac{1}{2}$ miles from the Marié ledge, and E. by N. $\frac{3}{4}$ N. $2\frac{3}{4}$ miles from the highest head of the Catheue reef; Champeaux point kept in sight to the westward of pointe du Roc leads well to the westward.

HAVRE de REGNEVILLE is situated near the mouth of two little rivers, named the Sienne and the Soulles, the waters of which unite 4 miles in the interior, but being so entirely filled with sand, it will only admit coasters of about 8 or 9 feet draught at high-water springs. The bottom of the harbour being chiefly composed of sand and shells is bad for holding; the anchors should therefore be buried to avoid driving with strong winds between W.N.W. and S.W., to which the entrance is exposed.

The entrance lies between the Bec d'Agon or Agon point, and the point on which the guard-house stands (which with Mont Martin windmill is the mark for the south-west extreme of the Ronquet group), and several sand-banks lie in the fairway. Two channels lead to the entrance. The principal channel runs along the south side of the Ronquet group and the Moulières d'Agon, and the leading mark for it is the fort (standing

3 cables to the north-west of the extremity of Agon point) seen between the steeples of Coutances and that of Grimouville, E. $\frac{1}{2}$ N.

The other channel, named the Colière, is not quite so deep as the former, but it has the advantage of leading directly into the harbour, and avoiding the turn to the south-east of Agon point. The Caillou rock, which uncovers 17 feet, lies on the east side of this channel, and the leading mark in is, Grimouville church-steeple a little open to the right of the custom-house (the last large house on the shore on the north part of Régneville village), E.N.E. With strong winds between N.N.W. and W.S.W., a heavy sea breaks with great violence at the entrance, and during this time no vessel should attempt to enter without a pilot.

LIGHT.—A *fixed* white light, dioptric and of the fourth order, is exhibited on Agon point. It is elevated 33 feet above high-water, and visible in clear weather from a distance of 10 miles.

Tides.—It is high-water, full and change, at Régneville at 6 h. 20 m. ; springs rise 35 feet, neaps 26 feet.

BANCS de la CATHEUE are composed of sand, and extend north and south 6 miles, nearly parallel to the line of coast. Two patches near their middle dry at low-water great springs, at which period there are 6 feet on their south end, and 2 fathoms on their north end. These banks are in some measure connected with the shore as far south as the Roc de Granville, and to the north as far as the Ronquet reef by a bed of sand which has only from 2 to 12 feet over it at low water, at which time there is no navigable passage between the banks and the shore.

La Catheue is a dangerous reef, about a mile long in a W.S.W. and E.N.E. direction, and a quarter of a mile broad, lying close to the north end of the Catheue banks. There are several heads on it, two of which uncover at low water great springs, and the rest have 5 and 6 feet over them at the same period.

The highest head, which uncovers $2\frac{1}{2}$ feet, lies on the middle of the reef, W. by S. $\frac{3}{4}$ S. $2\frac{3}{4}$ miles from the westernmost head of the Ronquet reef, N. $\frac{1}{4}$ W. $8\frac{1}{2}$ miles from Granville lighthouse, and N.E. by E. $\frac{1}{2}$ E. $7\frac{1}{2}$ miles from Chausey lighthouse. The marks for it are, Mont St. Michael just open westward of Champeaux point, nearly South ; Chauey lighthouse in line with the south side of the Etat (Chausey) S.W. by W. $\frac{1}{2}$ W., and Coutances cathedral in line with Agon point E. $\frac{1}{2}$ N. Champeaux point open and shut with pointe du Roc (Granville) S. $\frac{1}{4}$ W. leads to the eastward of Catheue banks and Catheue reef ; and Agon church-steeple in one wit the southern slope of mont Huchon, E. $\frac{1}{4}$ S., leads a safe distance to the northward of that reef and the Shamrock knoll.

PORT de GRANVILLE.—The entrance to the harbor is marked by a black bell buoy

The entrance to the harbor is marked by a black bell buoy with half-inch diameter.

SANDWICH KNOLL.—A small sandy knoll, one mile long in a N. $\frac{1}{2}$ E. and S. $\frac{1}{2}$ W. direction, and 2 miles broad, with 4 feet on its south end which is the shallowest part, and 3 fathoms on its north end. The south end is less than half a mile to the westward of Tombelaine reef.

Admiralty Bank.—The narrow range of sand, not more than 2 miles wide, extending 1 mile N.E. by N. and S.W. by S. with only 7 fathoms on its shallowest part. The depth is more at its north end, and from the point of anchorage south of E. $\frac{1}{2}$ E. $\frac{1}{2}$ miles: Coasters anchored at anchor, between the point and mill of point Martin N.E. by E. $\frac{1}{2}$ E.: the Coasters are also with the anchorage of the Hydrographer W. $\frac{1}{2}$ N. and the Star just above to the northward of the Canal-Champeaux N.W. $\frac{1}{2}$ N.

Coasters anchored in line with point Martin, stretch N.E. by E. $\frac{1}{2}$ E. leads to the eastward of the bank; the Star, vice its own breadth open to the northward of the Canal N.W. $\frac{1}{2}$ W. leads to the northward, as does point St. Martin, vice its own breadth open to the westward of Champeaux point, South.

DANGERS off PORT de GRANVILLE.—The navigation between Granville and the Chaney Isles, at the period of low-water springs, is difficult and dangerous, and entirely unnavigable for vessels drawing more than 7 or 8 feet, by the numerous banks and knolls of sand which form a bar, with not more than from 14 to 17 feet on the deepest parts, several patches have only 2 to 6 feet over them; small coasters, however, by following the direction given for this passage, can pass between these banks and the Admiralty bank in not less than 10 feet at low water.

Banc de Tombelaine.—The flats extending from 1 $\frac{1}{2}$ miles W. by N. of pointe du Roc to Champeaux point, and on which there are from one to 6 feet at low-water springs, extend 3 $\frac{1}{2}$ miles from the shore westward of St. Pair; it then gradually narrows until nearly abreast of Champeaux point, where it again projects to seaward in a long narrow spit, having 9 feet on its outer end which bears N.W. 4 $\frac{1}{2}$ miles from Champeaux point. The highest of these are the Tombelaine bank, the top of which is awash, and another little ridge of sand which uncovers a foot. This latter lies S.W. about 2 $\frac{1}{2}$ miles, and the summit of the Tombelaine S.W. by W. $\frac{1}{4}$ W. a mile from Granville pier-head light.

Banno Dorrière is a small isolated rock rising from a sandy bottom, with 4 feet over it at the lowest tides. It lies a cable N.N.E. of the north

end of the Tombelaine, with Granville lighthouse bearing E.N.E. northerly, one mile, and the pier-head light E. $\frac{1}{2}$ N., $1\frac{2}{10}$ miles.

Banc Haguët is composed of a number of shoal heads with from 2 to 6 feet on them at low-water springs, and from 9 to 15 feet between. It extends $2\frac{3}{4}$ miles in a N. by W. and S. by E. direction and the northern head with 6 feet on it lies N.W. $\frac{3}{4}$ N. $3\frac{3}{4}$ miles from Granville lighthouse. Between this head and the southern end of the Admiralty patch there is a passage about one quarter of a mile broad with 11 feet at low water. Chausey lighthouse touching La Chapelle rock leads through this passage. The southern end is nearly joined to the Banc de Tombelaine by a narrow ridge of sand that almost dries at low-water springs, thus forming a complete bar at low water between Granville and the Chausey isles, as mentioned in page 351.

Banc de Rondehaie, a small patch of sand, gravel, and rock, with 10 feet on it at low water springs, lies W. by S. $4\frac{1}{2}$ miles from Granville lighthouse. The spire of Granville church seen open northward of the lighthouse leads nearly a mile to the northward of the bank; the Culassière rock (Chausey) in line with the Huguenans beacon N. $\frac{1}{2}$ E. leads to the westward; and Culassière rock midway between the Huguenans and the Conchée N. $\frac{1}{2}$ W. leads to the eastward.

There is a small knoll with 23 feet on it, lying N.N.W. about 3 cables from the Rondehaie.

La Videcoq, a small rock which uncovers $2\frac{1}{2}$ feet at the lowest tides, has from 18 to 20 feet on all sides of it over a sandy bottom. It lies westward of the Haguët bank, with Granville lighthouse bearing E. by S. $\frac{1}{2}$ S. $3\frac{4}{10}$ miles; Chausey lighthouse N.W. $\frac{1}{2}$ N. $5\frac{1}{2}$ miles; Granville church in line with the second southernmost chimney of the south-western barrack, E. by S. $\frac{1}{2}$ S.; and the Culassière rock (Chausey) nearly in one with the Conchée, N. by W. $\frac{1}{2}$ W. Granville church in line with the northernmost chimney of the south-western barrack leads half a mile northward of the rock; the same church in line with the southern chimney leads a quarter of a mile to the southward; the Mauvaise rock in one with the Conchée leads half a mile to the eastward; and the Mauvaise in line with the Huguenans leads to the westward.

This danger is marked by a red and black bell buoy.

A small sand bank, about 8 cables long, N.W. and S.E., and one quarter of a mile wide, with only 6 feet on it, lies half a mile to the northward of the Videcoq. The Mauvaise kept midway between the Huguenans and the Conchée, N. by W. $\frac{1}{2}$ W. leads to the westward of it; and the three mills of Bréville kept a little open to the northward of the foot of Ménars point leads to the northward.

according to the range of the tide. The outer harbour can be entered at ordinary neaps from $1\frac{1}{2}$ hours before to $1\frac{1}{2}$ hours after high water; the bottom is composed of mud, and a sharp vessel will ground upright and lie in safety.

A beach of muddy sand and gravel extends 8 or 9 cables off shore between pointe du Roc and Champeaux point, and several rocky ridges rise above it, and uncover at low water springs. These rocks begin about 2 miles to the northward of Champeaux point, and extend almost uninterruptedly along the outer part of the beach as far as Gautier point. This latter point, bearing S.E. by E. $\frac{1}{4}$ E. 9 cables from the south-west extreme of Le Roc, is high, and on its summit is a fort which commands the entrance of the harbour. The rocky bed forming the base of the western part of Le Roc also uncovers at low water as far out as 2 cables North and N.W. from the north-west part of the peninsula, and $3\frac{1}{2}$ cables S. by W. from pointe du Roc, which has on it a beacon surmounted by a globe, the upper part of this beacon is painted white and the lower black.

Le Loup, the nearest danger to the harbour, lies S. by W. $\frac{3}{4}$ W. $2\frac{1}{4}$ cables from the extremity of the pier, and uncovers 21 feet at the lowest tides. This rock forms a kind of natural breakwater, sheltering the harbour from the heavy sea during south-westerly gales. The pier-head lighthouse in line with the gap which separates Le Roc from the hills to the north-east of it bearing N.E. $\frac{1}{4}$ E. leads a cable westward of the Loup; and the same lighthouse in line with Granville church steeple N. by E. $\frac{1}{4}$ E. leads half a cable to the eastward. This rock is marked by a stone tower painted with red and white horizontal bands, which exhibits a green light when there is sufficient water to enter the harbour, and covers at half flood, at which period there are 10 feet between the pier-heads, 6 feet within them, and $16\frac{1}{2}$ feet over the Tombelaine bank.

LIGHTS.—Granville lighthouse, 42 feet high, stands on pointe du Roc or cape Lihou and exhibits, at 154 feet above high water, a *fixed* white light, of the third order, visible in clear weather 15 miles.

A *fixed red* light, dioptric and of the fourth order, is shown from a lighthouse on the south-east extremity of the pier-head, on the west side of the entrance to the outer harbour. It is elevated 40 feet above high water, and visible 4 miles.

A Life Boat is stationed at Granville.

DIRECTIONS from CAPE de la HAGUE to GRANVILLE through COTENTIN PASSAGE.—This passage runs along the western coast of the peninsula of Cotentin, and is situated in a great measure on the sandy flat which occupies nearly the whole extent of the shore between cape Carteret and Granville. Coasters

shut in the north-west peak of the lofty light-coloured sand-hills of Hatainville (page 328) with the dark bluff and nearly perpendicular point of cape Carteret, N. $\frac{3}{4}$ E., which is the fairway mark between the Félés banks and the coast, and will lead over the tail of these banks in 15 feet at the lowest tides.

If there be water enough for the vessel to proceed to the southward, keep the latter mark on, and it will lead between the Jourdan ridge and the foul ground off the Senequet rock; but the sand-hills must again be opened out when passing this foul ground. Cape Flamanville just in sight to the westward of cape Carteret will lead over the south-east tail of the Félés banks; but it must for the same reason be gradually opened out as the vessel proceeds to the southward. Rosel point in sight to the westward of cape Carteret leads nearly midway between the Jourdan ridge and the foul ground off the Senequet; but Rosel point is not always well defined, being confused with the land behind it.

When in the vicinity of Senequet rock, steer so as to get Champeaux point 6 miles southward of Granville, just in sight, westward of pointe du Roc, the west extreme of the peninsula on which the town of Granville stands, bearing S. $\frac{1}{4}$ W., which (if the state of the tide and the vessel's draught will admit) will lead up to pointe du Roc, inshore of Catheue reef; but if there be not water over the banks, look out, as the vessel advances to the southward, for the remarkable trees on mount Hucon, about 2 miles northward of Coutances, and do not bring them in line with Agon church until the Etat (Chausey) appears in one with the Huguenans about S. by W. $\frac{3}{4}$ W.

The latter will be the leading mark to the westward of Catheue reef until Coutances cathedral comes in line with Bec d'Agon or Agon point, when steer towards Granville, keeping the Etat well open northward of the Canue, and after passing them, until Mont St. Michael appears within twice its breadth of Champeaux point bearing South, or until Coutances cathedral comes in line with Mont Martin church, N.E. by E. $\frac{1}{4}$ E., either of which will lead eastward of the Admiralty bank. When Chausey light-house opens to the southward of the Huguenans, W. by N. $\frac{3}{4}$ N., haul up for it, to avoid the Haguet bank, or anchor, if there is not sufficient water to enter Granville. At the early period of 2 hours' flood there will be 11 feet over the Catheue, the Founet, and the Cartheue banks.

The French pilots generally proceed through the Cotentin passage as follows:—

If by day, run through Alderney race if possible during the last of the north-east stream, then, if the vessel's draught be not too great to pass without risk between the Félés banks and the land at low water, steer to the southward to bring Jobourg church-steeple in line with the extreme of

cape Flamanville, N. by E. $\frac{1}{4}$ E., and by keeping this mark very carefully on, it will lead eastward of the Bihard flat, and the Caillou rock, and over the Surtanville banks, in 3 fathoms at low water. When the steeples of port Bail and Gouey open of cape Carteret, steer S.S.E., so as to be about $2\frac{1}{4}$ miles from that cape when it is in line with cape Flamanville, bearing N. $\frac{1}{4}$ E. From thence, by keeping the latter cape open and shut of cape Carteret, it will lead between the Félés banks and the main as far as the Senequet, but when abreast St. Germain a vessel may sheer in a little towards the coast and anchor to the north-west of the Sac-de-Pirou rocks to avoid the strength of the northern stream; or if the wind is strong enough she can proceed on, steering about S. by W. $\frac{1}{4}$ W., to pass midway between the Jourdan and the western extreme of the foul ground of the Senequet. By keeping the Hatainville sand-hills shut in by cape Carteret, there will be a certainty of passing to the eastward of the Jourdan.

As soon as Coutances cathedral is in line with Blainville church, steer S.W. to run between the Marié ledge and the north extreme of the Catheue reef, continuing on this course until Agon church tower is in line with mont Huchon bearing E. $\frac{1}{4}$ N., at which time the vessel will be sufficiently advanced for the beacons on the Huguenans and the Etat (Chausey) to be made out, and by keeping them in one, it will lead up in the fairway. If bound to Granville, run on with these beacons in line until the Tombelaine rock opens a sail's breadth to the westward of Champeaux point, S. $\frac{1}{2}$ E., when keep it so, and after passing the Founet steer for the harbour according to wind and tide. This latter mark is generally used by the pilots, as they consider it leads in the deepest water over the sandy bed to the north-west of Granville and the bar which unites La Roc with the Chausey islets, and also clear of the dangers to the eastward of these islets and of those that surround pointe du Roc.

At Night, when through Alderney race, and having given the Nez-de-Jobourg a berth of at least 3 miles, steer towards cape Flamanville; as that cape is approached keep the light at cape de la Hague open and shut of the Nez, N. by E. $\frac{1}{4}$ E., and it will lead to the westward of and a safe distance from the Bihard flat. When cape Carteret light bears S.S.E. steer towards it on that bearing for $2\frac{1}{2}$ miles, when the vessel will be about $3\frac{1}{2}$ miles from the light and 2 miles from the Rit rocks. From thence steer S. by W. $\frac{3}{4}$ W. until the light bears E. $\frac{1}{4}$ N., then S.S.E. until it bears N. $\frac{1}{2}$ E., when keep it on the latter bearing and steer S. $\frac{1}{2}$ W. to round the south-east part of the Félés banks.

Having run 6 or 7 miles on the latter course, haul out a little from the land to bring the light on a N. $\frac{3}{4}$ E. bearing, and by keeping it so it will lead between the Jourdan ridge and the foul ground off the Senequet.

When Chausey light is sighted, steer for it on a S.W. $\frac{1}{2}$ S. bearing, and it will lead between the Marié ledge and the Catheue reef, until Granville light bears S. by E. $\frac{1}{4}$ E., in which position a vessel can anchor until daylight; or if there is sufficient water to enter Granville harbour, by still keeping the light on that bearing she will pass midway between the Founet and Admiralty bank and the Catheue banks, until within $1\frac{1}{2}$ or 2 miles of the Roc de Granville, when keep to the westward and open the light on the pier head, and it will lead up to the entrance.

ENTERING GRANVILLE.—Bring the lighthouse on the pier-head open of the fall of the land under the eastern end of Garrison bluff; or, if wishing to pass to the eastward of the Loup rock, open Granville church its own breadth to the eastward of the lighthouse, to pass between the tail of the Loup and the rocks on which the pier is built. Give the pier-head, when rounding it, a berth of a ship's length only, and drop the anchor when convenient; shooting, however, as far to the westward as possible when within it. A vessel drawing 10 feet must not attempt to round the pier-head until 4 hours flood, especially if there be any sea.

All possible sail should be carried when entering the harbour, and everything in readiness at the shortest notice for anchoring or running out a hawser to the warping buoy between the Loup rock and the plateau Jean-le-Banche, in the event of a sudden shift of wind. The great inequalities of the rocky ridge extending S.W. 4 cables from Granville lighthouse, occasion, when it blows hard from N.W., round westerly, to S.W., a heavy sea outside the mouth of the harbour, and the outer part of this ridge, which uncovers 9 feet at the lowest tides, is then very dangerous; there is also a heavy breaking sea in the passage between the pier and the Loup with strong winds between N.W. and West. This dangerous part will be avoided by keeping St. Nicholas church-steeple in line with the southern slope of Gautier point, E. $\frac{3}{4}$ S.

Should the wind be light, endeavour to maintain a position off the harbour, so as to be carried towards the entrance from $1\frac{1}{2}$ hours before to half an hour after high water, while the stream is running to the East and E.N.E.; but do not attempt to enter before high water, lest the vessel should be carried to the westward of the pier, and even on Pointe du Roc, by the eddy of flood, which leaves the harbour after traversing the quays from East to West. This eddy, the strength of which is from one to $1\frac{1}{2}$ knots at springs, runs from half flood to high water, and it is to stem this that all sail should be carried when entering the harbour.

When arriving off the harbour before there is sufficient water to enter, if the wind be strong enough to stem the tide, keep to the southward of the line on which St. Nicholas church-steeple is in line with the slope o

the south part of Gautier point, E. $\frac{1}{2}$ S. With the wind from N.E., round northerly, to W.N.W., keep to the northward of this line, and make short tacks to the southward of the Chansey islets, between Chansey lighthouse and the Couchée; and with the wind from W.N.W., round westerly, to South, short boards should be made between Grouin point and the Parisienne ridge without going to the southward of the parallels of the Pierre de Herpin or Champeaux point. As soon as there is water sufficient to enter the harbour steer for it, keeping the lighthouse on the pier-head in line with the gap which separates Le Roc peninsula from the hills to the north-east of the town, N.E. $\frac{1}{2}$ E.; this will lead a cable westward of the Loup, and to the entrance of the harbour.

In working towards the harbour from the S.W., make a long board to the northward of the line on which St. Nicholas church-steeple is in line with the slope of the south part of Gautier point, E. $\frac{1}{2}$ S., to avoid being carried too far to the northward by the flood stream. The last board should be made to the south-east of the Loup, but not nearer than half a mile, to avoid a ridge of rocks named the Norocher, parts of which uncover from 10 to 12 feet at the lowest tides. From thence stand to the eastward of the Loup, on which side it can be approached to half a cable without danger. Should the beacon on this rock be washed away, Granville church steeple in line with the lighthouse on the mole head, N. by E. $\frac{1}{2}$ E., leads clear to the eastward.

Small coasters arriving off the harbour with the wind off shore at low water during the neaps, can anchor until there is sufficient water to enter, between the Loup and the Tombelaine bank, over a bottom of sand and broken shells. There are a few rocks on the eastern part of this anchorage, but by keeping mont St. Michel open and shut of Champeaux point, it will be 2 cables to the westward of them.

LEAVING GRANVILLE, a sailing vessel of large draught should wait for a leading wind, and, if bound to the westward, advantage should be taken of off-shore winds, particularly those between East and South. If the wind is between E.S.E. and S.S.E., and strong enough to stem the tide, leave as soon as the vessel floats, and steer to pass 2 or 3 miles to the northward of Cezembre island and cape Frehel. If between South and W.S.W., haul out to the warping buoys as soon as she is afloat, and make sail from the farthest out. Short boards must be made as far as Thar point, $2\frac{1}{2}$ miles to the southward of the harbour, and thence they may be lengthened, coasting at a safe distance from the dangers as far as cape Frehel, to avoid being carried by the rapidity of the stream on the Minquiers ledge. In fine weather the lights at Chansey, Granville, the harbour light of St. Malo, and at cape Frehel, render this navigation as easy by night as by day.

From GRANVILLE through COTENTIN PASSAGE.—Vessels bound to harbours eastward of cape de la Hague, or on the north side of the English channel, if their draught will admit and they have a leading wind, generally run through the Cotentin passage. For this purpose Granville harbour should be left directly the vessel floats, and when clear of the foul ground surrounding pointe du Roc, keep Tombelaine islet a sail's breadth open to the westward of Champeaux point S. $\frac{1}{3}$ E., and it will lead to the westward of the Catheue reef, and to the eastward of the Marié ledge. By keeping point Champeaux in line with pointe du Roc bearing about S. $\frac{1}{4}$ W., the vessel will pass to the eastward of the Catheue. At low water springs the only mark that can be used with safety is, the Huguenans beacon in line with the Etat beacon, S. by W. $\frac{3}{4}$ W., which leads to the westward of Shamrock knoll, midway between the Catheue and the Marié, and when Coutances cathedral is in line with Agon church tower, haul up and steer N. E. $\frac{1}{4}$ E. to pass between the Jourdan ridge and the foul ground off the Senequet.

A good look-out should now be kept for the buoy on the Jourdan, and as soon as it is seen steer so as to pass a little to the eastward of it. Hatainville sand-hills shut in with cape Carteret, N. $\frac{3}{4}$ E., will clear the Jourdan, or cape Flamanville in sight to the westward of cape Carteret, N. $\frac{1}{4}$ E.

If the weather be foggy, and cape Flamanville cannot be distinctly seen, when about 2 miles westward of the Senequet, steer N. by E. $\frac{1}{2}$ E., taking care not to open the above sand-hills to the westward of cape Carteret. When abreast St. Germain, steer North, or a little more to the westward to bring capes Carteret and Flamanville in line, before reaching the parallel of the entrance to Surville. These capes in line will lead up to cape Carteret, but as soon as the steeple of St. Pierre les Moutiers is in line with the slope of the eastern part of the hill of cape Carteret, N. E. $\frac{1}{4}$ N., or when within about 2 miles of the cape, steer N.W. $\frac{1}{4}$ N. until the Nez-de-Jobourg is one quarter of a point open to the westward of cape Flamanville, N. $\frac{3}{4}$ E. By following this latter mark exactly it will lead over the south-east part of the Surtainville banks in 2 fathoms at low water, and up to an anchorage in Sciotot bay; but should Vauville bay be preferred, steer so as to give cape Flamanville a berth of half or three-quarters of a mile in rounding it, to avoid the overfalls of it.

The southern stream begins to be felt at cape Flamanville about $2\frac{1}{2}$ hours later than in the south-east entrance to the Cotentin passage, whence it follows that a vessel in running through this passage 2 hours before high water at Granville, and sailing at the rate of $6\frac{1}{2}$ or 7 knots, will, at the springs, reach cape Flamanville or the anchorage in Sciotot bay before the southern tide makes. But at neaps, this passage can rarely

be traversed through its whole extent by a sailing vessel in one tide, unless with a strong leading wind. The anchorage abreast St. Germain must, therefore, be resorted to during the southern stream, and as soon as it slackens proceed under all sail, so as to reach the Race of Alderney before the north-east stream has acquired its full strength, as it will be of great assistance if bound to the eastward.

At Night steer with Granville light on a S. by E. $\frac{1}{4}$ E. bearing, and it will lead midway between the Admiralty and the Cathene banks. When Chausey light bears S.W. $\frac{1}{4}$ S., by keeping it so and steering N.E. $\frac{1}{4}$ N., it will lead in the fairway between the Shamrock knoll and the Marié ledge, also between the Jourdan ridge and the foul ground off the Senequet rock.

When the light is seen on cape Carteret, steer for it on a N. $\frac{1}{4}$ E. bearing until about $1\frac{1}{2}$ miles off the cape, which round at this distance; and when the light opens to the eastward of the hill haul to the northward, to bring the light S. by E. $\frac{1}{4}$ E., and then by steering N. by W. $\frac{1}{4}$ W. the vessel will pass to the westward of the Bihard flat. As soon as the light at cape de la Hague is seen, keep it on a N. by E. $\frac{1}{3}$ E. bearing, open and shut of the Nez-de-Jobourg, and it will lead $1\frac{1}{4}$ miles to the westward of cape Flamanville. The vessel can now either anchor in Vauville bay until the northern stream has made, or stand off and on.

Tides.—It is high water, full and change, at Granville, at 6 h. 13 m., springs rise 37 feet, neaps $27\frac{1}{4}$ feet. The tide rises above the sill of the floating basin (which is 8 feet 3 in. above the level of the lowest springs), about 39 feet at equinoctial springs, 32 feet at ordinary springs, and 20 feet at neaps.

CHAPTER IX.

GRANVILLE TO CAPE FREHEL.

VARIATION IN 1882.

Baie du Mont St. Michel	-	-	18° 20' W.
Cape Frehel	-	-	19° 0' W.

The COAST.—The lighthouse on cape Frehel bears W. $\frac{1}{4}$ N. $29\frac{1}{2}$ miles from that of Granville, and the coast between forms a deep bight to the south-east named Baie du Mont St. Michael, in which is situated the roadstead of Cancale, affording excellent shelter from the westward for vessels of any size. The harbours of St. Malo and St. Servan lie to the westward of this bay, and, like Granville, can be entered at springs by vessels of the largest draught.*

The most remarkable objects on this part of the coast are the Bec de Champeaux or Champeaux point, mont St. Michel and the Tombelaine islet. The former is a bold high bluff formed at the western extreme of green hills, which suddenly break off to seaward $5\frac{3}{4}$ miles S. $\frac{1}{2}$ W. of Granville lighthouse. Mont St. Michel and the Tombelaine are two conspicuous objects rising from the sands in the eastern part of Mont St. Michael bay. The former is a remarkable pyramidal block of granite, 4 cables in diameter, which at high water is completely surrounded, but from which at low tide the sea recedes to a great distance, leaving it dry for several miles. Its summit is surmounted by large buildings and an ancient abbey church, the steeples of which are 420 feet above the level of the beach. It bears South, nearly 7 miles from Champeaux point, and its exterior resembles mount St. Michael in Cornwall. The Tombelaine is a barren islet almost as large as mont St. Michel, but much lower. It lies nearly $1\frac{3}{4}$ miles to the northward of the Mont, and when seen from the northward or southward, has the appearance of a crushed pyramid inclining to the eastward.

Between Granville and Champeaux point the coast curves slightly in to the eastward, and is generally of middling height; but in some places it is low and sandy, and dangerous to approach with westerly winds, being bordered by a sand-bank with flat rocks on it, which in some places extend a mile from the shore.

BAIE de MONT St. MICHEL is formed between Champeaux and Grouin points, which bear W. by N. and E. by S. from each other

* See Admiralty chart:—Chanel islands and coast of France, No. 2,669 b; scale $m = 0.5$ inch.

about 11 miles, and is in a great measure exposed to all the violence of N.W. and westerly winds: the anchorage, however, off Cancale and La Houle in the north-west part of the bay, afford excellent shelter against westerly winds. The head of the bay falls back a great distance to the south-east, and nearly three-fourths of it is occupied by an immense bank of sand, which dries at low water. On the west side of the bay the land is high for the space of 4 miles from Gronin to Château Richeux point, and the coast is generally steep. Cancale and La Houle are situated on this part of the coast, the former on the heights and the latter on the shore. A high pyramidal rock, named the Châteilier, and the little fortified island of Rimains, lie off Chaine point the first 2 and the other 4 cables from the point, and it is to the northward of this island, and about three-quarters of a mile from the coast, that is situated the Grande Rade de Cancale.

The low lands, called the marsh of Dol, begin at Château Richeux point and extend 15 miles eastward, to the mouth of the river Couësson, the course of which separates the department of Ile-et-Vilaine from that of La Manche. A strong dyke protects this marsh from the invasion of the sea, as its surface in several places is below the level of high water great springs.

The only remarkable rise on this part of the coast is a small isolated hill named mont Dol, and a chain of hills, which seen from a north-west direction seem to form a long promontory, the north-west extreme of which is called by the local mariners point de Gogré. Mont Dol rises from the midst of the marsh land at 6 miles to the south-east of Château Richeux point, and on its flat top stands a windmill, a telegraph, and a few cottages. Point de Gogré is the nearest point to the sea of the chain of hills which are situated about three-quarters of a mile from the beach between mont Dol and the river Couësanon.

Small vessels can go up the Couësson at springs as far as the town of Pontorson, but as the navigation is difficult it is seldom attempted. The little harbour of Vivier is situated on the shore of the bay, S. $\frac{1}{4}$ E. about 7 miles from Gronin point, but it can only be entered by the smallest craft having good pilots. It is formed at the bottom of a cove hollowed out of the mud by the waters of the Guyoul, having a floodgate which prevents the sea from entering the river, and will contain three or four cutters. There is a small quay for the purpose of unloading.

LIGHT.—On the western side of mont St. Michel a fixed *red* tidal light is shown from a mast, at an elevation of 41 feet above high water (54 feet above the ground), visible through an arc of 180°. The light is only exhibited from 2 hours before high water, until 1½ hours ebb, and should be seen in clear weather 6½ miles.

BANC de CHATRY bounds Cancale road to the westward, and has only 6 to 9 feet on its shoalest parts at the lowest tides. It is joined to the coast at Chaîne point by a bed of sand, on which there are 11 and 12 feet; and thence it trends to the northward as far as a small creek named port Mer, leaving between it and the shallows near the shore a swatchway 3 cables broad, called by the local mariners fosse de Chatry or Chatry deep, in which the depths vary from 26 to 32 feet.

From the northern part of this bank, Haut Bout windmill is in line with the northern declivity of Chatry point; and from its eastern edge, the Cormorandière is in one with the Hubert. These are two remarkable rocks joining Rimaîns island; the first is high and pointed, and lies at the north extreme of the island; the Hubert is in shape like a gunner's quoin, and lies about three-quarters of a cable to the eastward of the fort.

BANC des CORBIÈRES, bounding Cancale road to the eastward, is about $1\frac{1}{2}$ miles long, from the line on which Haut Bout windmill is in one with the northern declivity of Chatry point, to the line on which the same windmill is in one with the Cormorandière rock, and about half a mile broad. It is joined to the sandy beach at the head of Mont St. Michael bay by flats, on which the soundings gradually decrease from 20 to 8 feet at the lowest tides.

The general depths on this bank vary from 2 to 4 fathoms, but a small patch about 3 cables long, north and south, and with only 10 feet in it, rises from its southern part, about half a mile to the eastward of the fort on Rimaîns island. From the north end of this patch, the guard-house on Chaîne point is in one with Cancale church-steeple; and from the south extreme the same steeple is between the Châtellier rock and Petit Rimaîns islet, which joins its northern end at low water.

Les BANCHETS.—This bank of sand and broken shells lies in the middle of the entrance to Cancale road, 3 cables to the northward of the Corbières bank, and S.E. by E. $\frac{1}{2}$ E. three-quarters of a mile from the old fort on Landes island, and with a small knoll of $23\frac{1}{2}$ feet at 2 cables N.N.W. of it, is dangerous to vessels of large draught at low water springs. The bank is $5\frac{1}{2}$ cables long N. by W. and S. by E., and the soundings on it vary from 10 to 24 feet. The shoalest parts form two small ridges lying parallel to each other, and athwart the direction of the streams. On the north-west ridge there are 17 feet at the lowest tides, and only 10 feet on the highest part of the other, which rises from the eastern part of the bank. The marks for the 10 feet are, the steep point of Château Richeux open 1° eastward of Chaîne point; and the slope of Grouin point open the same distance to the northward of the guard-house on Landes island. The local mariners say that the sand forming this bank does not

the water is the only safe anchorage for a small vessel.

There is a small island of dry low water in Hawk Bay near the northern point of the inner bay of port Mor. The reef here just west of the entrance of the point leads between this island and the *Pointe de la Houle*, and at low tide the summit of the same point leads to the southward of the island. There are two other islands, with 24 and 25 feet of water, lying a cable to the northward of the *Banchets*.

La BREHAUT is an extensive flat of sand and rocks, lying to the north-east of the *Banchets*, and half a mile to the eastward of the northern part of the *Cancale* beach. The soundings on it vary from 7 to 10 fathoms, and as the ground is very foul it should be avoided.

Landes island, with the *Herpin*, *Pierre de Herpin* and *Fille* rocks, and a few shoal patches, form a kind of barrier extending 2 miles to the north-east of *Grouin* point, and across which vessels should pass when seeking shelter in *Cancale* road, or in the anchorage off *La Houle*.

ÎLE des LANDES.—This high, narrow, rocky islet, steep on all sides and inaccessible when there is any swell on, lies two cables eastward of *Grouin* point, and at high water it is about 4 cables long, N.E. and S.W., and about a cable wide, but at low tide it is lengthened out 3 cables to the N.N.E. by some high rocks, and by some which cover. It trends in a direction nearly parallel to the shore, being separated from it by a channel called the *Vieille Rivière*, where is only 164 yards broad at its narrowest part, and through which at the springs the streams run 6 knots. The ruins of a fort and guard-house stand on the north-east part of the island. The *Pignonet* rock, with only 10½ feet on it, lies in the middle of the passage between the north-east extreme of *Landes* island and the *Herpin* rock.

Lo HERPIN is a high pyramidal rock elevated about 66 feet above the highest tides, and its base is a cable in diameter at low water. It lies E.N.E. three-quarters of a mile from *Grouin* point, and nearly 2 cables from the north-east extreme of *Landes* island, and its shape, great height, and isolated position, render it a remarkable object from a great distance. Vessels bound to *Granville*, run for shelter under this rock with the wind off shore, and generally when it blows from West, round southerly, to East. There is good anchorage in 7 to 9 fathoms water with the rock bearing N.W. ½ W. distant from one to 1½ miles; the ground, however, so far out, is rather coarse.

LIGHT.—Lighthouse building.

Pierro de Horpin.—This small rocky ridge, the highest head of which uncovers 32 feet at the lowest tides, lies N.E. by E. ¾ E. three-quarters of a mile from the *Herpin*. It begins to show itself about one-

third ebb during springs, and does not cover during the neaps. It is proposed to erect a light-house on this danger.

The space called the Grand-Ruet, separating this ridge from the Herpin, is the principal entrance to Cancale road from the north-west; but a shoal, named Basse due Milieu, with only 4 feet on it, lies $4\frac{1}{2}$ cables to the north-east of the Herpin, and narrows this passage, which is otherwise deep enough to be used by vessels of any draught at all hours of tide. They should, however, borrow within a cable of the Herpin when passing it on the flood, as this stream sets strongly over the shoal and the Pierre de Herpin; the flood begins to make in the passage about $5\frac{1}{4}$ hours before high water at St. Malo or Granville, and as it runs to the S.E. and E.S.E. there is no reason to fear of being drifted by it towards the Blanchets.

A rocky ridge, with from 22 to 24 feet on it, lies S. by E. a quarter of a mile from the Pierre de Herpin.

La Fille, the north-easternmost rock of these dangers, uncovers 11 feet at the lowest tides, and lies E.N.E. 3 cables from the Pierre de Herpin, and 2 miles on the same bearing from Grouin point. The marks for it are, the summit of the Herpin in one with the northern head of the Pierre de Herpin; and the Bigne rock seen between the Grand Chevreuil and Cezembre island.

A bell buoy, striped red and white, marks this danger on its northern side.

When the Pierre is covered, there will be $19\frac{1}{2}$ feet water on the Fille, and a vessel will be to the northward of them both when Grouin point is open to the northward of the Herpin, and to the southward when the point is open to the southward of the Herpin. Cape Fréhel in one with the latter rock also leads to the southward.

There are $8\frac{3}{4}$ fathoms water in the passage between the Pierre and the Fille, and a vessel can pass through it in safety when the Pierre is uncovered, by keeping from $1\frac{1}{2}$ to $2\frac{1}{2}$ cables from it; but it would have the disadvantage of placing her too much to leeward, if seeking shelter from strong westerly winds in Cancale road.

GRANDERADE de CANCALE is situated to the northward of Rimains island, at three-quarters of a mile from the shore between the Chatry and the Corbières bank, and affords excellent shelter for ships of large draught during westerly winds. A vessel should moor north and south with open hawse to the westward, and the best holding ground will be found with the Cormorandière rock seen between Rimains island and the Hubert rock; its eastern limit being the Cormorandière touching the eastern side of the fort on Rimains, and its northern limit, Haut Bout mill in line with the middle of a small white sandy beach, called Portz Picain,

situated close to the southward of Chatry point. North-easterly winds sometimes cause a swell, but vessels are seldom obliged to weigh suddenly from a shift of wind; it will, however, be prudent before furling to double reef the topsails.

There is also good anchorage in the southern part of the road in 7 fathoms, clay and mud, about 2 cables eastward of Rimaîns island, with the steeple of Cancale church in line with the middle of the fort on the island, W. $\frac{3}{4}$ N., and Grouin point a little open westward of Landes island, N. $\frac{1}{2}$ W. A vessel under 10 feet draught can anchor to the southward of Rimaîns island, with that island bearing North, distant half a mile; but in running for this anchorage at low water, keep within a quarter of a mile of the island, to avoid the shoal patch of 10 feet on the Corbières bank. If unable to ride here in heavy weather from the north-eastward, take the top of high water and run aground with good sail upon the mud to the southward of Cancale church, where both the vessel and the crew will be saved.

Anchorage East of Corbières Bank.—Vessels of large draught sometimes anchor to the eastward of Corbières bank, but they will be less sheltered there than in Cancale road, and more exposed to North-east winds, which, when they blow hard, throw in a heavy sea, and they will roll heavily on a weather tide. The anchoring ground extends north and south, from the line on which Haut Bout mill is in one with the small white sandy beach (portz Picain), situated close to the southward of Chatry point, to that on which Cancale church-steeple is in one with the southern side of the Châtellier rock.

The best berth is in 6 to 7 fathoms, blue tenacious clay, with the steeple of Doll church in line with the foot of the eastern slope of mont Dol; and the steeple of Cancale church between the Châtellier and the fort on Rimaîns. This position is the nearest to Rimaîns, but as it is about $1\frac{1}{4}$ miles from it, that island will afford but little shelter from the westward. If intending to remain any time, the anchors should be sighted occasionally, as they bury themselves deeply, making it difficult to weigh.

Merchant vessels generally prefer the anchorage to the southward of the Corbières bank, where the holding ground is good, and the depths from 19 to 22 feet at low water. The best berth is close to the southward of the line on which Haut Bout mill is in one with Cormorandièrè rock, N.W. $\frac{1}{4}$ N., with the mill between the northern point of Rimaîns island and the fort on that island; but the safest position for them is in the southern part of Cancale road.

Anchorage in Fosse de Chatry.—Vessels of moderate draught anchor in the deep or swatchway, formed between the western edge of the Chatry bank and the shallows near the shore, and the best

position is in from 26 to 32 feet at low water, with Haut Bout mill in line with the small white sandy beach close to the southward of Chatry point; and mont Dol opening and shutting to the eastern point of the islet, called Petit Romain, lying close to the northward of the Châtellier rock. This is a good anchorage during the neaps, but at the springs the streams run from 4 to 5 knots. Small craft can anchor a little farther in shore, but not westward of the line on which Mont Dol is seen touching the western side of the Châtellier.

A vessel that can take the ground will be sheltered from N.E., round northerly, to S.S.W., on the deposit of soft mud which borders the northern part of the little bay of port Mer.

LIGHT.—On Fenêtre rock, port of Houle, Cancale, a *fixed red* light is shown from a circular tower at an elevation of 33 feet above high water, and is visible in clear weather 7 miles.

Directions.—When running from the westward for shelter in Cancale road from a position about N.N.E. 2 miles from Cézembre island, steer to the E.N.E., keeping the semaphore on Garde Guérin point open to the northward of the fort on Grande Conchée islet, until mont St. Michel appears in sight to the south-east, when haul to the southward, and by keeping the mont open and shut with the Herpin rock bearing S.E. $\frac{1}{4}$ E. it will lead between the Grune rock and Nid patch. When about half a mile to the N.N.W. of the rock, if the flood is running, steer to pass about a cable to the eastward of it, as that stream sets strongly over the Milieu shoal and the Pierre de Herpin, and thence haul to the southward for the road.

The passage between Grouin point and Landes island as well as the passages between the north-east extreme of Landes island and the Herpin, and between the Pierre de Harpin and the Fille, are dangerous to attempt without a pilot.

The COAST.—Grouin point, the west extreme of Mont St. Michel bay, is bounded by rocky precipices, and forms a considerable narrow slope to the north-east. The sudden change in the direction of the coast to the southward is here very remarkable, and easily recognized from a distance.

Varde point bears W. $\frac{1}{4}$ N. 6 miles from Grouin point, and the rugged coast between is formed by a succession of valleys, which extend to the shore, and their openings, mostly sandy, are nearly on the level of high-water springs. The valleys are separated from each other by high points, bordered with steep rocks. The most remarkable of these points is that of Meinga, which lies $3\frac{3}{4}$ miles to the westward of Grouin point, and is nearly as high as cape Frehel; it is narrow and steep on all sides, and extends in a slope more than half a mile to the northward.

Between Grouin and Meinga points there is nothing worthy of notice except a small bay formed between Nid and Nez points, in the inner part of which is a sandy beach defended by fort Duguesclin. The fort is erected 3 cables to the south-west of Nid point, on a rocky islet joined to the shore at low water by a ridge of rocks. Midway between Meinga and Varde points is the little harbour of Roteneuf, which is greatly encumbered with sand, and the tide only begins to enter it at half flood.

Vessels of large draught should keep at least 2 miles from the coast between Grouin and Varde points at all times of tide; indeed, great precaution is always necessary when navigating between Grouin point and cape Frehel, to avoid the numerous dangers lying scattered at a greater or a less distance from the shore. The principal of those are named, the Renardières, Grune, Nid, Rault, Tintiaux, Rochefort, Bigne, Grands Pointus, &c.

Banc des Renardières, composed of sand and shells, lies N.N.W. $\frac{1}{2}$ W. $1\frac{1}{4}$ miles from the Herpin rock, and the soundings on it vary from 36 to 45 feet at low water. The bank is only a cable broad, and trends half a mile in a N. by W. and S. by E. direction, nearly across the streams, which cause a heavy sea on it during a weather tide. From its shoalest part the fort near Varde point appears midway between Grand and Petit Chevreuil, W. by S. $\frac{1}{3}$ S., and the Herpin is in line with the north-east extreme of the hills, named Pointe de Gorge, at the head of Mont St. Michel bay.

Basse Grune is a dangerous isolated rock, with only 8 feet on it and 10 to 12 fathoms close around at low water, lying N.E. $\frac{1}{2}$ E. $3\frac{1}{2}$ miles from Meinga point, and N.W. by N. rather more than 3 miles from the Herpin. It occasions great overfalls, even in moderate weather, and is much in the way of vessels proceeding to Granville or Cancale road. The marks for it are, the north extreme of the Rochefort rock in line with the semaphore on Garde Guérin point, W. by S. $\frac{1}{3}$ S.; Granville church perceptibly open southward of Granville lighthouse; and Cancale church its own length open westward of Haut Bout mill, South.

Granville church in sight to the northward of Granville lighthouse East, leads well to the northward of the Grune; Garde Guérin semaphore in line with the Petite Conchée leads a mile to the north-west; Mont St. Michel in line with the Herpin S.E. $\frac{1}{4}$ E. will lead to the southward, and between it and the Nid patch; and a vessel will be to the eastward of it when Cancale church opens to the eastward of Haut Bout mill. When the Pierre de Herpin is covered there are at least 38 feet of water over the Grune, and 46 feet over the Rault and Nid.

In moderate weather vessels of any draught may pass at all hours of the tide between the Grune and the Nid, by keeping mont St. Michel

open and shut with the Herpin bearing S.E. $\frac{1}{4}$ E. The lights of cape Frehel, Granville, and Chausey are visible from the Grune; the first bears W. $\frac{3}{4}$ N. $17\frac{1}{2}$ miles, Granville light E. $\frac{1}{4}$ N. $12\frac{1}{2}$ miles, and Chausey light N.E. $\frac{1}{4}$ N. $7\frac{3}{4}$ miles.

At 2 miles N.W. $\frac{1}{4}$ N. from Basse Gruhe, a buoy marked Nationale, with letter A, is moored in 10 fathoms.

Basse du Nid, a small rocky patch lying about $1\frac{1}{4}$ miles to the southward of the Grune, with 17 feet water over it, and 8 to 9 fathoms around it. Is quite as dangerous as the Grune, and from it Meinga point bears S.W. by W. $\frac{3}{4}$ W. $2\frac{1}{4}$ miles; the Herpin rock S.E. by E. $2\frac{3}{4}$ miles; the telegraph of the church of St. Malo is seen over Varde point touching the Petit Chevreuil; the fort which stands a little to the southward of Varde point, is in line with the north declivity of the Grand Chevreuil W. by S. $\frac{3}{4}$ S.; and mont St. Michel is in line with the rocks extending from the north point of Landes island. The Mont kept open and shut with the Herpin, S.E. $\frac{1}{4}$ E., leads well to the northward.

Basse Rault.—This small isolated rocky head lies $1\frac{1}{4}$ miles to the westward of the Nid, N. by E. $\frac{1}{4}$ E. $1\frac{1}{2}$ miles from the Meinga point, and N.W. by W. $\frac{3}{4}$ W. $4\frac{1}{2}$ miles from the Herpin rock. It has only 16 feet water over it, 9 to 10 fathoms around it, and like the two former dangers, it should be carefully avoided at low tide by vessels of large draught, and by small craft when it blows hard, as it causes a great swell.

The marks for the Rault are, the semaphore on Garde Guérin point a little open to the southward of the Rochefort rock, W. by S. $\frac{1}{2}$ S., and the eastern slope of Meinga point almost shutting in Terqueté mill. The above semaphore in line with the fort on the Grande Conchée bearing W. by S. $\frac{1}{2}$ S. leads to the north-west; and mont St. Michel open and shut with the Herpin S.E. $\frac{1}{4}$ E., leads well to the northward.

Les TINTIAUX form a rocky group about a mile long, E.S.E. and W.N.W.; and half a mile broad, lying 4 cables north-east of Meinga point. Most of the rocks appear at 4 hours ebb, and the highest, near the centre of the group, are about 30 feet above the lowest tides, and remain uncovered at the neaps. Garde Guérin point semaphore open to the northward of the Bigne rock, or the summit of the Grands Pointus (which never covers) in line with the fort on the Grande Conchée, lead to the northward; and Duguesclin fort not brought to the southward of S.S.W. or Haut Bout mill kept in line with the guard-house on Verger point (the eastern point of the first sandy beach to the westward of Grouin point), lead to the eastward.

TINTIAUX PASSAGE, between the Tintiaux and the land, is generally resorted to by coasting vessels with southerly winds. The leading mark through, when coming from the eastward, is the Bigne rock in line



with the south side of Cezembre island, W. $\frac{1}{4}$ N. Give Meinga point a berth of a quarter of a mile when passing it, and then run out between the 'Tintiaux and the Basse aux Chiens, with St. Vincent mill (on the heights at the head of Roteneuf harbour) touching the eastern part of the high land at Binar.

The Rochefort lies $1\frac{1}{2}$ miles to the north-west of Meinga point, and with a small ledge named the Platier, forms a rocky group 3 cables long N.E. and S.W., and a cable wide. The highest head of the Rochefort shows about $2\frac{3}{4}$ hours' ebb, uncovers 34 feet at the lowest tides, and does not cover at neaps.

Rochefort rock is marked by a tower of masonry, the top of which is 13 feet above high water; it is painted with black and red bands, and is surmounted by a ball.

The marks for the Rochefort are, the guard-house on the summit of Varde point its own breadth open to the westward of the Bigne, S.W. $\frac{1}{3}$ S., and St. Vincent mill in one with the western bluff point of Binar, S. $\frac{1}{3}$ W. The semaphore on Garde Guréin point its own length open to the northward of the Grande Conchée leads a quarter of a mile northward of the Rochefort; and Paramé church in one with the Bigne leads to the westward.

HAVRE de ROTENEUF.—This little harbour, situated midway between Meinga and Varde points, is about three-quarters of a mile wide and half a mile deep, but it is greatly encumbered with sand, and the tide only begins to enter at half flood; the approach also is endangered by several rocks that cover. The local mariners say, that in case of need vessels of 15 or 16 feet draught may find shelter in it at high-water springs, but they must keep within a quarter of a cable of the eastern point of the entrance, named Binar point, when passing it.

A remarkable tree in the town of Roteneuf in one with the westerly rocky bluff point of Binar, S. by W. $\frac{1}{4}$ W., will lead between the Rochefort and the Hautieux rocks to the entrance of the harbour.

Basse Trouvée is a dangerous isolated rock lying E. by N. $\frac{3}{4}$ N. $11\frac{1}{2}$ miles from cape Frehel, and W. $\frac{1}{4}$ N. the same distance from the Chausey lighthouse, with only 13 feet over it and from 14 to 15 fathoms around it at low water. The marks for it are, the fort on the Grande Conchée in one with the eastern part of the fortifications of La Cité, S. $\frac{3}{4}$ W.; and the Amas-du-Cap touching the southern part of the village of Hopitaux d'Erqui, W. by S. $\frac{1}{2}$ S. The Amas-du-Cap seen between the eminence on which the above village stands and cape Frehel, but a little nearer to the eminence than the cape, leads to the northward; and the same eminence kept between the Amas-du-Cap and cape Frehel will lead

to the southward. The rock occasions great overfalls during springs, and the sea breaks over it during strong winds.

Basse des Sauvages are two rocky heads lying in a N.N.W. and S.S.E. direction, and distant 2 cables apart. There are 39 feet on the N.N.W. head, 27 feet on the S.S.E. head, and 14 to 16 fathoms around them at low water. From the S.S.E. head, which is only dangerous to vessels of large draught, cape Frehel bears W. by S. $\frac{3}{4}$ S. southerly, 6 miles the pier-light at St. Malo S.S.E. $\frac{1}{4}$ E. $9\frac{1}{4}$ miles; and the marks for it are, Saudray point, a little open eastward of Cierge point (the next point southward of Latte point), S.W. $\frac{3}{4}$ W. and St. Malo church (on the steeple of which there is a telegraph) in line between the two hillocks on Cezembre island S.S.E. $\frac{1}{4}$ E.

The Amas-du-Cap touching the southern part of the village of Hôpitaux d'Erqui, W. by S. $\frac{1}{3}$ S., leads half a mile to the south-east of the Sauvages; the north-east extreme of Cezembre in one with the above telegraph S.S.E. leads to the north-eastward; and the telegraph in one with a rock named Muriers, lying at the south-west extreme of Cezembre, leads to the southward.

Le Catis.—This isolated rocky head is dangerous to vessels of large draught at low water springs, at which period there are only 25 feet on it, and 14 and 15 fathoms around it, and to small vessels when it blows hard on a weather tide, as there is then a heavy sea. It lies with the lighthouse on cape Frehel bearing W. $\frac{1}{2}$ S. distant 3 miles; the summit of Cezembre island S.E. $\frac{3}{4}$ E. $7\frac{1}{4}$ miles; and the telegraph on the steeple of St. Malo church S.E. $\frac{1}{4}$ E. $9\frac{1}{2}$ miles.

The marks for the Catis are, the summit of cape d'Erqui exactly in the interval which separates cape Frehel and the Amas-du-Cap; the tower of Latte fort in one with the hillock on Cierge point, S.W. $\frac{2}{3}$ W. By shutting in cape d'Erqui with cape Frehel a vessel will pass to the southward of it; and by opening cape d'Erqui half a point to the northward of the Amas-du-Cap, she will pass to the northward.

Le VIEUX or OLD BANK is a rocky ledge lying nearly 4 miles to the north-west of Cezembre, and generally betrays itself by a rippling. It is about 4 cables long in an E.S.E. and W.N.W. direction, and 2 cables broad, and has several heads on it, with but little water on them. From the highest head, which is situated at the west extreme of the ridge and uncovers 5 feet at low-water equinoctial springs, with a black and red bell buoy moored close to it, cape Frehel lighthouse bears W. by N. $\frac{1}{4}$ N. $6\frac{1}{10}$ miles, and the pier light at St. Malo S.E. $\frac{3}{4}$ S. $6\frac{4}{10}$ miles; and the marks for it are, Varde point just open to the northward of the Haies de la Conchée, S.E. by E. $\frac{1}{2}$ E., the highest of the Pierres des Portes in one

with the south-west bastion, called St. Philippe, of the fortifications at St. Malo, S.E. $\frac{1}{2}$ S., and the mill at Chesne in line with the southern slope of St. Cast point, S.W. by W. $\frac{3}{4}$ W. The marks for the bank are, St. Hydeuc church midway between the Petite Conchée and Cezembre, S.E. $\frac{3}{4}$ E., and St. Guildo windmill just open to the westward of Colombière islet, S.W. $\frac{1}{2}$ S.

Parané church in sight northward of Petite Conchée S.E. $\frac{1}{2}$ S., or the Herpin rock twice its own breadth open northward of the Rochefort rock, E. by S. $\frac{3}{4}$ S., leads northward of the Vieux bank; the same church in sight to the southward of Cezembre, S.E. by E., leads to the southward; St. Guildo mill in line with the western part of Ebhiens islet, S.W., leads to the eastward; and St. Jacut mill in line with the eastern part of the same islet, S.S.W. $\frac{1}{2}$ W. will lead to the westward. By keeping the summit of Varde point in line with the fort on the Grande Conchée S.E. by E. $\frac{1}{2}$ E., a vessel will pass between this bank and the Banchenou.

Le Banchenou, a small rocky ridge $2\frac{3}{4}$ miles to the northward of Ebhiens isle, and nearly two miles south-west of the Vieux bank, is dangerous to vessels of heavy draught at low water, but at 2 hours' flood, at the springs, there are from 25 to 28 feet over its highest head, which breaks occasionally, and has only 15 feet over it at the lowest tides. The marks for the 15 feet are the Bec Rond rock a little to the eastward of Chesne mill, W.S.W.; the Haies de la Conchée midway between the fort on Grande Conchée and the high part of Meinga point, E. by S.; and St. Jacut mill in line with the tower on Ebhiens islet, S. by W. $\frac{3}{4}$ W.; Cape Frehel lighthouse bears N.W. by W. $\frac{1}{3}$ W. $5\frac{1}{10}$ miles, and the pierhead light at St. Malo S.E. $\frac{2}{3}$ E. $6\frac{1}{2}$ miles.

This little danger lies directly in the fairway of vessels entering the river Rance through the Décollé passage, but St. Malo telegraph in line with the summit of the Cheminées (these are high rocks which do not cover, lying midway between Décollé point and Cezembre island), S.E. $\frac{3}{4}$ E., will lead well to the northward; the same telegraph in line with the fort on Harbour islet, S.E. by E. $\frac{1}{2}$ E., will lead half a mile to the southward; and it will be avoided to the eastward or the westward by opening St. Jacut mill east or west of Ebhiens islet.

Directions.—When steering along the coast between Grouin point and cape Frehel, at or after the dangerous period of half ebb, bear in mind that so long as the lighthouse on that cape is kept open to the northward of the Rochefort rock, there will be nothing to fear from the Tintiaux, or from the shoals in the immediate vicinity of Grouin point; and that by keeping the Herpin twice its breadth open to the northward of the Rochefort, the vessel will pass to the northward of the Vieux bank, and of all the dangers lying between it and the Rochefort. A patch of

rocky ground lies half a mile to the northward of the latter rock, but there are never less than 5 fathoms upon it, though it occasionally ripples.

ST. MALO.—The town of St. Malo is built on the small rocky island of Aaron, and communicates with the main land by means of a causeway, named Le Sillon, three quarters of a mile long and 54 feet broad, which is defended from the violence of the waves by strong outworks. The whole area of the island is occupied by houses, and the walls are flanked by towers washed by the sea.*

The manufactures of the town are hosiery, cordage, soap, fishing nets, &c., &c. Shipbuilding is carried on, and there is a large tobacco factory. Vessels are fitted out for the foreign and coasting trade, and for the whale and mackerel fisheries. The imports consist of colonial produce, spices, flax, hemp, &c.; there is also a considerable trade in corn, fruit, wine, brandy, salt, linen, cider, butter, honey, fish, salt provisions, &c.

The population of the commune in 1871 was 10,693, but including the town of St. Servan, which is situated on higher ground, and is sometimes reckoned a suburb of St. Malo, it amounts to 23,000.

PORT de ST. MALO, situated to the south-eastward of the town, is large and well frequented, but difficult of approach, and the flood rushes in with great strength, equinoctial tides rising to the height of 43 feet above the level of low water. It is also inconvenient of access to vessels of large draught during the winter months, as the time of high water, full and change, occurs at 6 h. 5 m. in the evening.

The port is converted into a Bassin à Flot, or floating basin. A strong granite wall is thrown across the entrance, having two openings, which are formed into locks with wide flood-gates. The width of entrance of the largest opening is 60 feet, and the tide rises above the bottom, which is 12 feet above the lowest springs, $28\frac{1}{2}$ feet at ordinary springs, 31 feet at great springs, and about 15 feet at neaps.

A neat substantial stone pier, called the Môle des Noires, is built on the Noires rocks at the south-west angle of the town, and in addition to its great convenience for landing passengers, protects the port from the heavy roll of the sea, which it otherwise would be exposed to with north-westerly winds. The pier is 1,290 feet long, and about 16 feet wide, and at its extremity is a light-tower.

Extensive quays, built of granite, border the east and south sides of the town of St. Malo; that on the east side is about 70 feet wide, and most

* See Admiralty plan, port St. Malo and environs, No. 2,700; scale, $m = 5$ inches.

conveniently adapted for stowage of cargoes. The ground at the foot of these quays is from 14 to 16 feet, and that alongside the quays at St. Servan 17 to 18 feet above the level of low-water springs, and at these tides vessels of the largest draught enter the port and moor alongside them; but during low tides not more than 12½ feet draught can reach the former quays, and 9½ feet the latter. Vessels lying at the St. Malo quays are sheltered on all sides, except when the wind is strong from South and S.S.E.; but those alongside the St. Servan quays surge violently and are much exposed when it blows hard between North and N.E.

A Life Boat is stationed at St. Malo.

LIGHTS.—Five lights are established at and in the vicinity of St. Malo to assist the intricate navigation amongst the numerous dangers which mark the approaches to the port.

Roche Bonne.—The easternmost light, at Roche Bonne, about 2½ miles from St. Malo, shown from a lighthouse white at base and black at summit, is a *fixed red* light, 128 feet high, and visible from seaward only between the bearings of E. by S. ¼ S., and S.E. by E. ¼ E. from a distance of 15 miles.

St. Malo.—On the Môle des Noires is a circular lighthouse, whence, at an elevation of 33 feet above high water, is shown a *fixed white* light visible 10 miles.

From a square white house in the depth of Anse des Sablons is exhibited a *flashing green* light, 60 feet high, showing a flash at intervals of *four seconds*, visible 8 miles.

Balluc.—Inland of the preceding S.S.E. ¾ E. 1,804 yards on the hills of Bulluc from a square building, the upper part of which is black a *fixed green* light is shown from an elevation of 221 feet, and is visible between the bearings of S.S.E. and S.E. ¼ S. from a distance of 9 miles.

Lo Grand Jardin.—On the south extreme of Le Grand Jardin islet is a circular lighthouse showing a *fixed white* light, varied every *twenty seconds* by alternate *flashes* of *red* and *green*, of two seconds' duration. The light is elevated 65 feet above high water, and is visible 12 miles.

ROADSTEADS.—There are three good roadsteads at the mouth of the river Rance, where vessels of large draught generally anchor to unload, or await high tides to enter the port. They are named Rade de St. Malo, Mouillage de Dinard, and Rade de Solidor.

RADE de ST. MALO is situated on the eastern side of the entrance to the Rance, at 4 cables westward of the town of St. Malo, and occupies a space about 1½ cables long, north and south, a cable wide, with 27 to 32 feet water over it at the lowest tide. It is bounded on the north

by the Basse Broutard ; on the east by a sand-bank which fronts the town and dries at low-water ; and to the southward by the Plateau de la Rance, the northern head of which lies S. $\frac{1}{3}$ E. a quarter of a mile from the Broutard.

Basse Broutard a small rocky patch, about 130 yards long, east and west, and 60 yards wide, with only 8 feet on it at the lowest tides, lies with the sentry box on Varde point between Grand and Petit Bey islets, and St. Hydeuc church steeple a little open northward of the northern bastion of the ramparts at St. Malo, E. $\frac{1}{4}$ S.

Plateau de la Rance.—This rocky ledge, 2 cables long, north and south, and a cable wide, has six dangerous heads on it, two of which uncover, one 2 feet, the other 3 feet, at the lowest tides ; there are from one to 2 feet on three of the other heads at the same time of tide ; and 16 feet on the sixth head, which lies on the northern part of the ledge. Two buoys, one *red* and *black* and the other *black*, mark the north and south extremes of this danger.

The telegraph on Garde Guérin point in sight between the Grand Vidé rock and the steep point of Roche Pelée, leads half a cable northward of the northern hedge of this ridge ; and the western head of the Bizeux rock in one with the high rock at the foot of Béchard point S. $\frac{1}{4}$ E., leads a third of a cable eastward of the ridge. A vessel will pass the same distance to the westward by keeping the beacon on the Mercière in line with the eastern head of the Bizeux ; and half a cable to the southward of the 2-feet head on the southern part of the ridge, by keeping the pier head of St. Malo in line with the outer angle of the bastion of St. Louis, the south-easternmost of the ramparts of St. Malo.

Anchorage.—The holding ground in St. Malo road is good, and vessels moor nearly North and South, in the direction of the tidal streams. The best position is in the middle of the road, with the eastern head of the Bizeux in one with the high rock at the foot of Béchard point, S. $\frac{3}{4}$ E. ; and the telegraph on Garde Guérin point a little open southward of the summit of the Grand Vidé, W. by N. $\frac{1}{4}$ N. Vessels of lighter draught anchor a little to the eastward of this.

The road is sheltered from all winds but those between North and West, which, when they blow with any strength, send in a heavy sea during the time the dangers outside the river are covered. The streams in it are not strong, the flood never exceeding 3 knots, and the ebb, which Béchard point turns to the N.N.W., never running with sufficient strength to prevent communication with the port. Sailing vessels wishing to leave the road for the port or a more sheltered anchorage in the river, when it blows hard from the westward, should not weigh till the latter stream has fairly made, to enable them to work to windward.

There is also good holding ground, with a depth of 18 to 22 feet over it, in the Petite Rade de St. Malo, at a short distance to the southward and south-eastward of the Plateau de la Rance. When at anchor in the centre of this road, the extreme of Béchard point will be in line with the middle of the Bizeux, and the outer angle of the bastion of St. Louis will be open about half a point to the southward of the pier head.

ANSE de DINARD.—This bay is formed abreast St. Malo on the western side of the Rance, between points Dinard and Vicomté, and the grounding places in it extend along its western shore, from the old shipyard below the village to the new one beneath the mill on Dinard point. The bottom dries 15 feet above the level of the lowest tides in the north-east part of the bay, and 18 feet in the south-west, springs rise from 18 to 24 feet, neaps 9 or 10 feet; it is composed of stiff mud covered with seaweed, and when it blows hard from the N.E. vessels strike heavily when grounding; and as the anchors of small vessels bite with difficulty care should be taken at low water to bury them in the mud; avoid also grounding to the eastward of the direction in which the fort on the Grande Conchée begins to open out of Dinard point, as the bottom is deeply furrowed.

MOUILLAGE de DINARD.—Vessels of large draught, that cannot enter port St. Malo during the neaps, often remain in the Mouillage de Dinard for the springs, as they are well sheltered there from all but northerly winds. This anchorage is just outside the outer edge of the mud in Dinard bay, and is half a mile in extent from the Petit Palais rock to the Schevré bank; its outer limit does not extend to the eastward of the line on which the high rock named the Muriers (lying close to the south-west point of Cezembre island) is just open and shut with the eastern slope of Dinard point.

The holding ground is good along the edge of the mud, out of the strength of the stream, with Champ Fleuri mill bearing S. by E. $\frac{1}{2}$ E. The best anchorage, where the depths are from 26 to 30 feet at low water, is limited to the northward by the line on which Solidor tower is seen between the extreme of Béchard point and the little fort; and to the southward by the same tower open its own breadth to the northward of the high steeple of St. Servan church.

This roadstead is the general rendezvous for vessels of war, and is preferable to that of St. Malo, being sheltered against the prevailing winds; but it will be prudent at all times to be ready to weigh or slip, if forced by bad weather to take shelter farther up the Rance.

ANSE et RADE de SOLIDOR together form an important maritime position. Frigates have been built in the bay, but the water not

being sufficiently deep for them in the road, they have been obliged to complete their armament in that of Dinard.

Solidor bay, situated on the west side of the town of St. Servan, is a cable wide at the entrance, and its shores are almost entirely occupied by the military establishments of the town. Merchant vessels intending to remain some time in the bay are usually placed at the entrance, between the quai des Corbières and the rocks lying at the foot of Solidor tower, where the bottom dries 12 or 13 feet above the level of the lowest tides; springs rise from 25 to 32 feet, neaps about 15 feet.

A small grounding place, called St. Père is formed in the northern part of the bay, at the foot of the peninsula of La Cité. It is about 84 yards wide, 270 yards deep, and will contain 14 or 15 vessels of the tonnage and draught of those employed in the Newfoundland trade. The grounding places towards the middle of the port are elevated 10 feet above the lowest tides. Vessels of about 13 feet draught can enter at high-water neaps.

Solidor road is only a small deep, 2 cables long, north and south, and about 80 yards wide, formed between the beach which dries in front of Solidor bay and the Solidor bank, which also dries and extends parallel to the shore; the soundings in it, however, are shallow, and long-heeled vessels occasionally take the ground, the greatest depth at low water being 18 feet. The road is sheltered on all sides at this time of tide, and when the bank is uncovered; but when it blows hard from the westward and the bank is covered there is a considerable swell.

Banc de Solidor bounds Solidor road to the westward, and uncovers 8 feet at the lowest tides. Its north extreme is 85 yards southward of Béchar point, and thence it extends 3 cables to the south-east and terminates 173 yards north-east of the Bizieux rock. It is about a cable broad, and composed of fine white sand mixed with broken shells.

Tides.—It is high water, full and change, at port St. Malo at 6h. 5m., springs rise 35 feet, neaps 26 feet. The water rises above the bottom of the large opening into the port (this opening has been converted into a lock with wide floodgates, its bottom being 12 feet above the lowest tides), about 32 feet at equinoctial springs, 25 at ordinary springs, and 14 at neaps. The streams run with great strength during springs at the entrance of the Grande and Petite Conchée channels; the flood to the north-east, the ebb to the south-west. Their rate is about 4 knots at half-tide, across the entrance of the Grande channel of the Rance, between the beacon on the Savatte and that on the Buron.

will pass 50 or 60 yards to the northward of a rock lying at the extremity of Dinard Point, and which covers a little before half flood.

During the springs, when the Mouillé is covered, or less than 3 feet out of water, vessels of large draught can run over the bank between that rock and the Pierres d'Amourette rocks, there being at that time at least 4 fathoms over it. To cross the bank, bring the Grand Vidé rock (which does not cover) in one with Garde Guérin telegraph, W. by N. then by steering E. by S. with these two objects in line, it will lead to the middle of the anchorage in St. Malo road, where vessels generally wait until there is sufficient water to enter the port.

During the springs vessels often pass to the northward of the Nerput, and enter the Décollé passage either by running between the beacon on the Mouillère and that on the Petit Pot de Beurre, or by passing close to the eastward of the beacon on the latter rock. When to the northward of the Nerput, and intending to enter the passage by the former route, bring St. Enogat church-steeple in line with the middle of a little patch of white sand situated close to the westward of Roche Pelée point S.E. $\frac{3}{4}$ S., and it will lead 2 cables northward of a 19 feet patch, named Rat du Nord-Est; a cable to the north-east of the Basses des Maréchaux; the same distance to the south-west of the Grande Basse and of the beacon on the Petit Pot de Beurre, and only 50 yards to the southward of a small rock which comes awash at low water and lies 170 yards to the south-west of the beacon.

If intending to pass to the eastward of the Petit Pot de Beurre, from a position to the northward of the Nerput, steer to bring the mill of St. Enogat in line with the north extreme of the above little patch of white sand, S.S.E. $\frac{3}{4}$ E., and these marks exactly in one will lead over a rocky patch named the Sauts aux Chiens (on which there are 10 feet at low water, and from 30 to 36 feet at half flood), and half a cable to the eastward of the beacon on the Petit Pot de Beurre. As soon as this beacon is passed, haul a little to the southward, to enter the passage and to avoid a small rock which lies a cable to the southward of the Grand Pot de Beurre, and uncovers 4 feet. As soon as the Nerput is in one with La Latte fort, run to eastward with this western mark on, and proceed as before.

From St. Malo Road to Solidor Road.—There are two dangers to be avoided when approaching Solidor road from that of Dinard or St. Malo. The first is the Rat de la Mercière, a small isolated rock, with only 4 feet on it, lying in mid-channel N.W. $\frac{3}{4}$ N. a third of a mile from Béchard point. When the Pourceaux rocks are covered, there are 17 feet on this danger, and 22 feet when the tide reaches the foot of the Pierres d'Amourette beacon. The other danger is the Mercière

ridge, lying half a cable to the westward of the peninsula of La Cité. The highest head on this ridge, which has a beacon on it, uncovers 20 feet at the lowest tides, and covers a quarter of an hour before half flood at the springs.

Vessels bound to Solidor road, and having entered the river Rance, may at neap tides pass either to the eastward or westward of the Rat de la Mercière; but at springs they should keep as much as possible over on the right bank of the river, to avoid the strong tides, and pass to the eastward of the Rat. For this purpose, when abreast St. Malo, keep the eastern head of the Bizeux rock and the Mercière beacon in one, until the pier head lighthouse at St. Malo is in line with St. Malo church; then steer to pass at the distance of three-quarters of a cable to the westward and southward of the Mercière beacon.

In case of necessity, a vessel may run between this beacon and the peninsula of La Cité, by keeping the pier head lighthouse in line with the north-west side of the Calfats rock; but this narrow passage had better be avoided as much as possible, as the tides run strong, and there are only 17 feet in it at low water.

The most favourable time for entering the road is at the time of high water on the shore, for it being entirely exposed to the eddy of the flood stream, occasioned by the extension of Béchard point, vessels entering before that period will experience, when rounding that point, and for the space of about a cable east and west, the effects of the flood setting with great velocity to the south-west, and of the eddy, not less strong, setting to the north-west. The eddy begins to be felt near the shore about 2 hours before high water, and its breadth and strength increase as the tide rises.

To enter the road, bring the tower of Grand Larron in line with that of Solidor, and it will lead between Béchard point and the Solidor bank. When within the latter, anchor as convenient; the services, however, of a local pilot are necessary to obtain a safe position.

CHENAL de la GRANDE PORTE.—The Grande and Petite Porte channels are the only navigable passages into St. Malo road or into the Rance at low water. They lie to the south-west of Cezembre island, and are divided by the Pierres des Portes rocks. They both unite between the Grand Jardin and the Pierres de la Savatte, at the entrance of the Grande channel of the Rance, and may be used by vessels of the largest draught at all times of tide; no square-rigged vessel of burthen, however, should attempt either of them but with a free wind of sufficient strength to follow the leading marks, and to stem the tide, and recollecting that the course when within the narrows, is about S.S.E. $\frac{1}{4}$ E.

will pass 5 or 60 yards to the northward of a rock lying at the extremity of Dinard Point, and which covers a little before half flood.

During the springs, when the Moullé is covered, or less than 3 feet out of water, vessels of large draught can run over the bank between that rock and the Pierres d'Amourette rocks, there being at that time at least 4 fathoms over it. To cross the bank, bring the Grand Vidé rock (which does not cover in one with Garde Guérin telegraph, W. by N. then by steering E. by S. with these two objects in line, it will lead to the middle of the anchorage in St. Malo road, where vessels generally wait until there is sufficient water to enter the port.

During the springs vessels often pass to the northward of the Nerput, and enter the Déolée passage either by running between the beacon on the Moullère and that on the Petit Pot de Beurre, or by passing close to the eastward of the beacon on the latter rock. When to the northward of the Nerput, and intending to enter the passage by the former route, bring St. Enogat church-steeple in line with the middle of a little patch of white sand situated close to the westward of Roche Pelée point S.E. $\frac{3}{4}$ S., and it will lead 2 cables northward of a 19 feet patch, named Rat du Nord-Est; a cable to the north-east of the Basses des Maréchaux; the same distance to the south-west of the Grande Basse and of the beacon on the Petit Pot de Beurre, and only 50 yards to the southward of a small rock which comes awash at low water and lies 170 yards to the south-west of the beacon.

If intending to pass to the eastward of the Petit Pot de Beurre, from a position to the northward of the Nerput, steer to bring the mill of St. Enogat in line with the north extreme of the above little patch of white sand, S.S.E. $\frac{3}{4}$ E., and these marks exactly in one will lead over a rocky patch named the Sauts aux Chiens (on which there are 10 feet at low water, and from 30 to 36 feet at half flood), and half a cable to the eastward of the beacon on the Petit Pot de Beurre. As soon as this beacon is passed, haul a little to the southward, to enter the passage and to avoid a small rock which lies a cable to the southward of the Grand Pot de Beurre, and uncovers 4 feet. As soon as the Nerput is in one with La Latte fort, run to eastward with this western mark on, and proceed as before.

From St. Malo Road to Solidor Road.—There are two dangers to be avoided when approaching Solidor road from that of Dinard or St. Malo. The first is the Rat de la Mercière, a small isolated rock with only 4 feet on it, lying in mid-channel N.W. $\frac{3}{4}$ N. a third of a cable from Béchard point. When the Pourceaux rocks are covered, there are 17 feet on this danger, and 22 feet when the tide reaches the Pierres d'Amourette beacon. The second danger is

ridge, lying half a cable to the westward of the peninsula of La Cité. The highest head on this ridge, which has a beacon on it, uncovers 20 feet at the lowest tides, and covers a quarter of an hour before half flood at the springs.

Vessels bound to Solidor road, and having entered the river Rance, may at neap tides pass either to the eastward or westward of the Rat de la Mercière; but at springs they should keep as much as possible over on the right bank of the river, to avoid the strong tides, and pass to the eastward of the Rat. For this purpose, when abreast St. Malo, keep the eastern head of the Bizeux rock and the Mercière beacon in one, until the pier head lighthouse at St. Malo is in line with St. Malo church; then steer to pass at the distance of three-quarters of a cable to the westward and southward of the Mercière beacon.

In case of necessity, a vessel may run between this beacon and the peninsula of La Cité, by keeping the pier head lighthouse in line with the north-west side of the Calfats rock; but this narrow passage had better be avoided as much as possible, as the tides run strong, and there are only 17 feet in it at low water.

The most favourable time for entering the road is at the time of high water on the shore, for it being entirely exposed to the eddy of the flood stream, occasioned by the extension of Béchard point, vessels entering before that period will experience, when rounding that point, and for the space of about a cable east and west, the effects of the flood setting with great velocity to the south-west, and of the eddy, not less strong, setting to the north-west. The eddy begins to be felt near the shore about 2 hours before high water, and its breadth and strength increase as the tide rises.

To enter the road, bring the tower of Grand Larron in line with that of Solidor, and it will lead between Béchard point and the Solidor bank. When within the latter, anchor as convenient; the services, however, of a local pilot are necessary to obtain a safe position.

CHENAL de la GRANDE PORTE.—The Grande and Petite Porte channels are the only navigable passages into St. Malo road or into the Rance at low water. They lie to the south-west of Cezembre island, and are divided by the Pierres des Portes rocks. They both unite between the Grand Jardin and the Pierres de la Savatte, at the entrance of the Grande channel of the Rance, and may be used by vessels of the largest draught at all times of tide; no square-rigged vessel of burthen, however, should attempt either of them but with a free wind of sufficient strength to follow the leading marks, and to stem the tide, and recollecting that the course when within the narrows, is about S.S.E. $\frac{1}{4}$ E.

The Petite Porte channel can only be entered by passing through a chain of scattered rocks extending from W.N.W. to N.N.W. across the entrance, and the streams in their vicinity during the springs attaining a velocity of 4 or 5 knots, make them very dangerous at low water, and at all times, by the overfalls they occasion, when the wind is fresh on a weather tide.

The westernmost of this rocky chain are the Buharats, the highest head of which, with only 7 feet on it, lies N.W. by W. $\frac{3}{4}$ W. $1\frac{1}{2}$ miles from the lighthouse tower of the Grand Jardin, with the Nerput rock in one with the summit of the mound on La Haye point, S.W. $\frac{1}{4}$ W.; the telegraph on St. Malo church in line with Petit Bey fort, S.E. $\frac{1}{3}$ E.; and the fort on the Grande Conchée midway between the north point of Cezembre and Meinga point, E. $\frac{1}{2}$ S. The Pierres des Portes are three elevated rocks, the middle one of which uncovers 37 feet and lies N.W. by W. $6\frac{1}{2}$ cables from the tower on the Grand Jardin; a tower with a ball on its summit is placed on the westernmost rock, which dries 25 feet at low water springs, and scarcely covers at high-water neaps. A black, conical buoy, with the word Rock on it in white letters, is moored on the south side of Pierres des Portes rocks, nearly one cable S.W. by W. $\frac{3}{4}$ W. from the westernmost rock. The Buharets have a black bell buoy, moored on their southern extreme.

The Bunel, the north-eastern danger of the chain, uncovers 12 feet, and lies N. $\frac{1}{2}$ E. 6 cables from the Grand Jardin tower, and is marked by a black and red buoy moored on the north side of it. The Hupions, on which there are 27 feet water, and the Grande Hupée, with only $4\frac{1}{2}$ feet on it, lie, the first 6, and the other $4\frac{1}{2}$ cables to the northward of the beacon on the Pierres des Portes. The Grande Hupée is very dangerous; the marks for it are, the highest head of the Pierres des Ports in one with the summit of Bellefard point, S.S.W., and the southern end of the fort on Varde point, touching the north side of the Petite Conchée, E. by S. $\frac{3}{4}$ S. southerly.

The Grande Porte channel is a continuation to the westward of the Grande channel of the Rance, and extends $1\frac{1}{2}$ miles in that direction from the Grand Jardin to the Buharats. The eastern part of this channel, at the entrance of the Grande channel, is about 2 cables wide, and its limits are shown by an iron beacon, with a ball on its summit, placed on the rocks lying off the Grand Jardin, and by a similar beacon on the rocks off the Pierres de la Savatte.

The former beacon, on the north side of this channel, stands on a rock which uncovers 19 feet at the lowest tides, and lies S. $\frac{1}{4}$ W. 70 yards from the Grand Jardin lighthouse. The beacon on the south side of the channel

is on the easternmost rock of the Pierres de la Savatte, named Pierre à la Vache, which uncovers 22 feet, and is awash at about half flood; the beacon bears S.S.W. $\frac{1}{4}$ W. 3 cables from the lighthouse. A rocky bank, named Traversaine, lies in mid-channel, between the two beacons, and is dangerous at low water springs, as it is steep-to, and is only 4 or 5 feet on it at that time of tide. A red buoy is moored near the north-west edge of this bank, with Petit Pot de Beurre in line with the guard-house of the Garde Guérin, and the Mole light of the Noires, in line with the tower of the town-hall of St. Servan. A red buoy also marks the shoal of the Pierres de la Savatte, and is moored northward of the Sou rock, with the house Lemoine (Bel-air) in line with the tower of Buron, and Mouillère beacon, in line with the guard-house of the Garde Guérin.

Grand Chenal de la Rance is $2\frac{1}{4}$ miles long, and extends from the Grand Jardin to St. Malo road. It is bounded on the western side by the Pierres de la Savatte, by the Pierre Salée flats, which have only 11 and 12 feet on them at the lowest tides, by an isolated conical rock named the Buron, which uncovers 24 feet and has an iron beacon on it surmounted by a ball, and by scattered rocky heads as far up as the Pourceaux rocks; and on the eastern side by the off-lying rocks of the Grand Jardin, by the Pierres Garnier, the highest head of which uncovers 5 feet, and by the rocky heads on the western slope of the Ouvras ridge, the greater part of which uncover at the lowest tides. The Pierres Garnier and the western edge of the Ouvras, are well marked by 4 black buoys.

The narrowest part of this channel is between a small rocky head, with only 3 feet on it, named Basse du Buron, the western edge of which is marked by a black buoy, and the red beacon with ball on the Buron rock; they bear E. by N. and W. by S. from each other, and are $1\frac{1}{2}$ cables apart. At 2 cables to the eastward of the eastern limit of this part of the channel, there is a beacon placed on the highest head of the Ouvras, which uncovers 14 feet.

Directions.—The leading mark through the Grande Porto channel is Grand Jardin and Roche Bonne lighthouses in line E. by S. $\frac{3}{4}$ S. By following this direction a vessel will pass about a cable southward of the bell buoy lying off the south-east head of the Buharats, close on the south side of a rocky head of 20 feet; a cable southward of the black buoy moored on the south side of the rocky heads lying to the south-west of the Pierres des Portes; and 50 or 60 yards northward of an 18 feet patch lying nearly a cable to the north-east of the Basse du Boujaron, which is awash at the same period, and marked on its north side by a red buoy.

When nearing the lighthouse be prepared to alter course a little before the lighthouse in Anse des Sablons comes in line with Ballue light-tower,

and proceed with these objects in line S.S.E. $\frac{1}{2}$ E. This course will lead over the 3-fathom spur off the S.W. end of Grand Jardin, nearly half a cable eastward of Traversaine bank; close to the edge of Pierre Salée Flats, and thence in mid-channel between the red beacon on Le Buron rock, and the black buoys on the edge of Les Ouvras, to the Rade St. Malo. By night the same directions will apply by using the lights.

Or when within 2 cables of Grand Jardin lighthouse, bring the Séminaire or college of St. Servan open, about half the apparent breadth of its front, eastward of the eastern angle of the citadel of la Cité S.S.E. $\frac{1}{2}$ E.; this will lead half a cable to the north-east of the Traversaine bank, the same distance eastward of the Pierre Salée flats, and three quarters of a cable eastward of the Buron rock beacon.

When entering this channel at low water it will be necessary to avoid an 18 feet patch lying nearly half a cable south-west of Grand Jardin lighthouse, and to do so keep the college touching the citadel until the beacon opens north of the mound, then edge to the southward for the fairway mark. A vessel will be eastward of the Traversaine bank when the mill of St. Lunaire comes within its own length of the Haumet rock. When rounding the Grand Jardin a good mark to lead to St. Malo road is, a large chimney in St. Servan open northward of St. Servan church, so as to see daylight between them S.S.E. $\frac{1}{2}$ E.

Another mark for entering the channel of the Grande Porte, between the Buharats and the Pierres des Ports, and with leading winds this route is to be preferred to all others at low water, is the steeple of St. Enogat church in line with the eastern side of Haumet rock, S. by E. $\frac{1}{2}$ E., until the north-west windmill of Petite Paramé is seen between the south-east mill of the same place and the south-east angle of the fortifications upon fort National S.E. $\frac{2}{3}$ E.; this will lead to the southward of the black buoy on the south side of the Couillons de la Port, and mid-channel between the Pierres de la Savatte and the Traversaine bank up to the leading mark for the Grande channel of the Rance. The face of the mill and the south-east angle of the fortifications are whitewashed, in order to be easily recognised at a distance.

If entering the Grande channel of the Rance by the Petite Porte channel, bring the west end of Cezembre island in line with the centre of the town of St. Malo S.S.E. $\frac{1}{2}$ E., and having arrived within 2 miles of the island steer to the southward, to bring the Grand Jardin lighthouse in line with the principal steeple of St. Servan, S.S.E. $\frac{2}{3}$ E.; this mark will lead between the Grande Hupée and the Rat des Courtis, and to the northward of the Basse Nord-Est des Portes; but when within 2 cables of the lighthouse steer to round the Grand Jardin, and proceed as before.

Grand Jardin lighthouse in line with the mill on Dinard point, S. by E., easterly, leads midway between the Bunel rock and the Hupions, and the same tower in line with Jeannet windmill, S.S.W., will lead between the Bunel and the shoals lying a cable westward of the south-west end of Cezembre; but in using this latter channel, a vessel must edge away to the south-west, to round the Grand Jardin as soon as either the steeple of Paramé church or that of St. Hydeuc opens out of the south-west point of Cezembre.

CHENAL de la PETITE CONCHÉE is only practicable for vessels of large draught between the periods of half flood and half ebb. Its entrance lies 2 cables eastward of the Petite Conchée, between the Rousse and Ronflesse, rocks which are only a cable apart. The Petite Conchée is the only rock between Cezembre island and the Grand Conchée that does not cover at the springs; the Rousse uncovers 33 feet, and the Ronflesse 28½ feet at the lowest tides.

Directions.—The west side of Petit Bey fort seen between the citadel of La Cité and the little forte on Béchard point S. ½ W. leads through the Petite Conchée channel, leaving the Rousse, the Rats, and the Queue des Rats to the westward, and the Ronflesse, the Pierres aux Normands, and the Roches aux Anglais to the eastward. There is a beacon on the middle of the Normands ridge, erected on a rock which uncovers 12 feet.

The above mark which only leads 50 yards to the westward of a sunken rock, lying off the western point of the Ronflesse, with 3 feet on it at low water springs, must be kept on until the mill of St. Lunaire, or the mound on Bellefard point, opens out to the southward of Harbour isle, when the vessel will be 1½ cables to the westward of the beacon on the Anglais, and must be edged more to the southward to bring the western head of the Bizeux in line with the high rock at the fort of Béchard point bearing S. ¼ E., which mark will lead to St. Malo road.

CHENAL de la GRANDE CONCHÉE derives its name from the Grande Conchée rock, and, like that of the Petite Conchée, can only be entered by vessels of large draught between half flood and half ebb. The entrance is bounded on its western side by the Haies de la Conchée, the Rimponière, and the Grande Conchée, and on its eastern by the Rousses and the Plate; and its position may be recognised by the fort on the Grande Conchée which may be seen from a great distance.

The Haies de la Conchée is a ridge of high rocks lying 3 cables to the northward of Grande Conchée fort, and their summits do not cover. The Rousses is an isolated head of rock, with only 6 feet on it at the lowest tides; the marks for it are, the Grand Chevreuil seen a little to the south-

ward of the guard-house on the inner part of Meings point, E. by S. $\frac{1}{2}$ S., and the mill of La Roche in line with the eastern gable of the barracks of Petit Bey, S.S.W. $\frac{1}{2}$ W. La Plate, at half a mile S.E. from the fort, uncovers 18 feet; and has a stone tower on it, elevated 10 feet above the highest tides, painted in red and black horizontal bands; although the sea is nearly always breaking on La Plate, the north and west sides may be safely approached, but there are two small rocks off its south side, the most distant of which, the Bouton, uncovers 12 feet, three-quarters of a cable S. by W. $\frac{1}{4}$ W. from the beacon, and is marked by a red buoy.

Several other patches are scattered about the entrance to this channel; the most dangerous are the Becfer, the St. Servantine, and the Rat de St. Servan. The Basse de Becfer lies North $2\frac{1}{2}$ cables from the two north-westernmost heads of the Haies de la Conchée, and has 15 feet on it at the lowest tides.

St. Servantine is a dangerous isolated rock, which uncovers 2 feet at the lowest tides; the marks for it are, the summit of the Ronflesse in one with the foot of Garde Guérin point and St. Hydeuc steeple in line with a mill which stands 4 cables S. by E. $\frac{1}{2}$ E. of the steeple. When the Ronflesse is covered there are at least 25 feet over the St. Servantine. A red bell buoy is moored on the north side of St. Servantine.

Rat de St. Servan is a small reef lying E. $\frac{2}{3}$ N. $6\frac{1}{2}$ cables from the fort on the Grande Conchée, and N.N.E. $\frac{2}{3}$ E. $5\frac{1}{2}$ cables from the beacon on the Plate; when the latter rock is covered, the Rat de St. Servan has 30 feet over it, the Rat du Rocher 33 feet, and the Têto 34 feet.

Basse de la Conchée, another isolated head, with 22 feet on it, lies N.E. 8 cables from the fort on the Grande Conchée, but is not dangerous at the time the channel is navigable.

Les Roches aux Anglais situated a quarter of a mile south of Pierres aux Normands, has a red buoy marked with the name moored on its south-east corner. This buoy is liable to be mistaken by a stranger for the buoy of Les Crapauds.

Les Crapauds du Bey, at about a quarter of a mile south of Les Roches aux Anglais, is marked by a black buoy moored on the north side.

Directions.—When running for the Grande Conchée channel from the eastward, be careful to keep the semaphore on Garde Guérin point its own breadth open northward of the Petite Conchée, W. by S. $\frac{1}{2}$ S., so as to pass to the northward of the Basse des Pointus, which has 18 feet on it at the lowest tides, the St. Servantine, and the Rousses.

In entering the channel, bring the mill of La Roche, situated on the high land three quarters of a mile to the south-west of Vicomté point, a

little westward of the fort and islet of Petit Bey, S.S.W. westerly; this mark will lead 3 cables eastward of the fort on the Grande Conchée, and 2 cables to the westward of the beacon on the Plate. Continue steering with this mark on, until nearly abreast the beacon on the Anglais, when haul a little to the eastward, to avoid this eastern rock of that ridge (as this mark leads only 20 or 30 yards to the eastward of the eastern rock), which uncovers $6\frac{1}{2}$ feet.

When to the southward of this danger, bring the above leading mark on again, and steer with it until Jeannet mill comes a little open northward of St. Enogat steeple, S.W. by W. $\frac{3}{4}$ W.; then keep this latter mark on, and it will lead to the northward of the Crapeuds du Bey, (or the steeple of St. Enogat in line with Jeannet mill, S.W. by W. $\frac{3}{4}$ W. westerly, will lead southward of Crapeuds du Bey), until the westernmost head of the Bizeux is in one with the high rock at the foot of Béchard point, and these two rocks in line will lead into St. Malo road.

The most direct leading mark to enter the Grande Conchée channel with, and the one most easily recognised, is the south-west corner of La Cité in line with the middle of Grand Bey islet, S. by W. $\frac{1}{2}$ W. Run with this mark on until St. Enogat steeple is in one with Jeannet mill, then round in as before.

CHENAL des PETITS POINTS lies eastward of the latter channel between the Plate rock and a rocky group named the Petits Pointus, the highest head of which has a beacon on it, and uncovers 33 feet at the lowest tides.

This channel is used by vessels approaching St. Malo from the eastward, and also by those which, when coming from the northward and westward, have been carried by the flood stream to the eastward of the Grande Conchée channel; it is, however only practicable for vessels of large draught between the periods of half flood and half ebb, but it may be used by coasters at all hours of tide.

Directions.—Vessels bound to St. Malo from the eastward, and intending to enter by the Petits Pointus channel, should when westward of the Basse Grune, steer with the semaphore on Garde Guérin point in line with the fort on the Grande Conchée, W. by S. $\frac{1}{2}$ S., and it will lead between the Grands Pointus and the Basse des Pointus, about 3 cables S.E. of the latter.

The highest head of the Grands Pointus rises about 8 feet above the level of the highest tides, and is an excellent mark for the entrance of this channel; the Basse des Pointus is an isolated rock, with 18 feet water over it. Having arrived within half a mile of the St. Servantine rock haul to the southward to get the leading mark for the channel on, viz.,

..
distant of which, the Bouton, uncovers 12 feet, three
S. by W. $\frac{1}{4}$ W. from the beacon, and is marked by a red

Several other patches are scattered about the entrance; the most dangerous are the Becfer, the St. Servantine
Servan. The **Basse de Becfer** lies North $2\frac{3}{4}$ cables
westernmost heads of the Haies de la Conchée, and has the
lowest tides.

St. Servantine is a dangerous isolated rock, visible
at the lowest tides; the marks for it are, the summit
one with the foot of Garde Guérin point and St. Hy
with a mill which stands 4 cables S. by E. $\frac{1}{4}$ E. of
the Ronflesse is covered there are at least 25 feet over
A red bell buoy is moored on the north side of St. Serv

Rat de St. Servan is a small reef lying E.
the fort on the Grande Conchée, and N.N.E. $\frac{3}{4}$ E.
beacon on the Plate; when the latter rock is covered
Servan has 30 feet over it, the Rat du Rocher 33
34 feet.

Basse de la Conchée, another isolated head
lies N.E. 8 cables from the fort on the Grande Conchée,
dangerous at the time the channel is navigable.

Les Roches aux Anglais situated a quarter
Pierres aux Normands, has a red buoy marked with
its south-east corner. This buoy is liable to be mistaken
the buoy of Les Crapauds.

Les Crapauds du Bey, at about a quarter
Les Roches aux Anglais, is marked by a black buoy;

little westward of the fort and islet of Petit Bey, S.S.W. westerly; this mark will lead 3 cables eastward of the fort on the Grande Conchée, and 2 cables to the westward of the beacon on the Plate. Continue steering with this mark on, until nearly abreast the beacon on the Anglais, when haul a little to the eastward, to avoid this eastern rock of that ridge (as this mark leads only 20 or 30 yards to the eastward of the eastern rock), which uncovers $6\frac{1}{2}$ feet.

When to the southward of this danger, bring the above leading mark on again, and steer with it until Jeannet mill comes a little open northward of St. Enogat steeple, S.W. by W. $\frac{3}{4}$ W.; then keep this latter mark on, and it will lead to the northward of the Crapauds du Bey, (or the steeple of St. Enogat in line with Jeannet mill, S.W. by W. $\frac{3}{4}$ W. westerly, will lead southward of Crapauds du Bey), until the westernmost head of the Bizeux is in one with the high rock at the foot of Béchard point, and these two rocks in line will lead into St. Malo road.

The most direct leading mark to enter the Grande Conchée channel with, and the one most easily recognised, is the south-west corner of La Cité in line with the middle of Grand Bey islet, S. by W. $\frac{1}{4}$ W. Run with this mark on until St. Enogat steeple is in one with Jeannet mill, then round in as before.

CHENAL des PETITS POINTS lies eastward of the latter channel between the Plate rock and a rocky group named the Petits Pointus, the highest head of which has a beacon on it, and uncovers 33 feet at the lowest tides.

This channel is used by vessels approaching St. Malo from the eastward, and also by those which, when coming from the northward and westward, have been carried by the flood stream to the eastward of the Grande Conchée channel; it is, however only practicable for vessels of large draught between the periods of half flood and half ebb, but it may be used by coasters at all hours of tide.

Directions.—Vessels bound to St. Malo from the eastward, and intending to enter by the Petits Pointus channel, should when westward of the Basse Grune, steer with the semaphore on Garde Guérin point in line with the fort on the Grande Conchée, W. by S. $\frac{1}{4}$ S., and it will lead between the Grands Pointus and the Basse des Pointus, about 3 cables S.E. of the latter.

The highest head of the Grands Pointus rises about 8 feet above the level of the highest tides, and is an excellent mark for the entrance of this channel; the Basse des Pointus is an isolated rock, with 18 feet water over it. Having arrived within half a mile of the St. Servantine rock haul to the southward to get the leading mark for the channel on, viz.,

the fort on Petit Bey a little open eastward of the guard-house on Dinard point, S.W. $\frac{1}{4}$ S., until Jeannet mill opens a little northward of St. Enogat steeple, the mark used when sailing into St. Malo road by the Grande Conchée channel.

By following carefully the leading mark for this channel, the vessel will pass a cable westward of the Basse Tangui, an isolated rock, with only 14 feet on it; three-quarters of a cable westward of the beacon on the Petits Pointus; and 2 cables westward of the Létrun d'Aval, which uncovers 5 feet.

CHENAL de la BIGNE is named after the Bigne rock, which lies three-quarters of a mile to the north-east of Varde point, and is the highest rock in the vicinity of that point, its summit being 32 feet above the highest tides. This channel is but little frequented except by vessels of moderate draught, with leading winds, and then it is only practicable for them at springs, between the periods of half-flood and half-ebb; at neaps it may be used by vessels drawing not more than 10 feet at all hours of tide.

Directions.—In steering for the entrance of the Bigne channel, between the Tintiaux group and the Rochefort rock, bring the Crolante rock, which lies at the foot of Varde point and uncovers 38 feet at the lowest tides, in line with the western side of the Grand Bey, S.W. by W. $\frac{1}{2}$ W. Run in with this mark on until the Bigne bears N.E. by N., or St. Lunaire mill is in line with Bellefard point W. by S. $\frac{1}{4}$ S., when keep it so, until St. Jeannet mill comes a little open to the northward of St. Enogat steeple; then proceed as before.

The first of these marks leads a cable south-east of the Basse aux Chiens, which lies half a mile south-east of the Rochefort, and uncovers 3 feet, about the same distance from the Basse du Durand, lying 6 cables south-east of the Rochefort, with only a foot on it at low water; and about a cable south-east of the Petite Bigne. The second mark leads a cable northward of the Crolante, and of a little rocky ridge, named the Canca-laise, which uncovers 9 feet; and $1\frac{1}{2}$ cables southward of the 2-feet patch on the south part of the Létruns, which is marked by a red bell buoy. The latter mark will lead in a fair way northward of the Crapauds du Bey.

Another mark for entering the Bigne channel is St. Malo church, in line with the Bigne rock S.W. $\frac{3}{4}$ W., and to run in on the eastern side of the Rochefort till within a quarter of a mile of the Bigne; then edge away to the southward, so as to round the latter rock at the above distance to avoid the Petite Bigne; when proceed as before.

The tides in this channel, between St. Malo and Varde point, never attain much strength at the springs, but they run strong to the north-east of the point.

CAPE de la HAGUE to ST. MALO through la DEROUTE PASSAGE.—The shortest and best route from cape de la Hague to St. Malo, with fresh leading winds, is through the Race of Alderney, and between Jersey and Serk through La Deroute passage, the distance being about 70 miles; it should, however, never be used by strangers at night, or during light winds, fog or snow.

If intending to take this route, enter the Race, if possible, on the slack or last of the north-east stream, which will be about 4 hours after high water at St. Malo, for at this period it presents no difficulty. Having cleared the Race steer with all possible sail about S.W. $\frac{1}{4}$ W. to enter La Deroute passage in mid-channel, and to ensure passing to the south-east of the Blanchard rock. This distance will be run in about $2\frac{1}{2}$ or 3 hours, or about low water at St. Malo, and the course should be continued to the southward so as to be in a good position to the westward of the Minquiers at the first of the flood. As this stream begins to be felt the more the vessel advances to the southward it will be necessary to determine by correct bearings the course to be steered, and to pay strict attention to the directions already given in page 338 for avoiding those dangers. When clear of the Minquiers steer for cape Frehel, where pilots are always on the look out.

To St. Malo through Grand Ruet Passage.—The space separating the islands of Guernsey and Jersey and the Minquiers ledge from the Roches Douvres, is called by the French pilots the Grand Ruet, and from its great breadth it would seem to offer a safe and easy route to St. Malo or Granville; the streams, however, run through it with such velocity at the springs, that should the stream and wind be in the same direction, a sailing vessel could not counteract their influence and avoid being drifted between the islands and the dangers in their vicinity. If surprised by fog or night the danger would be imminent, as from the continued changes in the set of the stream the reckoning cannot be depended on. It may be used at the neaps with a fresh northerly wind, but it will be prudent not to attempt it at the springs except under the following circumstances :—

A vessel having a steady westerly wind and being in a position about 8 miles W.S.W. of the south-west extreme of Guernsey, at the commencement of the ebb, or $2\frac{1}{2}$ hours after high water at St. Malo, should steer S. $\frac{1}{4}$ E. for a distance of 38 miles, or to about 6 miles N.W. by N. from cape Frehel.

This course will lead about $5\frac{1}{2}$ miles eastward of Maitresse isle on the Roches Douvres (which, if possible, should be sighted to correct the reckoning), 7 miles eastward of the Barnouic ledge, and 8 miles westward of the Minquiers. During the whole of this run the wind will be on the starboard side, counteracting the effect of the stream, which for the first four hours will be on the port beam, the fifth hour a little on the bow, and lastly on the starboard beam, as the flood begins sooner as the coast is neared.

To St. Malo through Cotentin Passage.—Directions have already been given in page 361, for navigating this passage when proceeding to Granville; but if bound to St Malo, and the vessel has arrived within 4 or 5 miles of the Etat beacon (called also Petite Canue,) a remarkable rock lying on the northern edge of the Chausey group, keep away a little more to the westward in order to round the north-west part of the group at the distance of about $1\frac{1}{2}$ miles.

When abreast the Rondes de l'Ouest, a rocky ridge forming the west end of the above group, steer S.W. or more southerly, keeping within 3 miles of the rocks until the old castle, in ruins, on Grande-Ile opens to the southward of the Corbière rock, E. by S. $\frac{3}{4}$ S., then edge away about S.W. $\frac{1}{2}$ W. for the entrance of one of the channels leading into the river Rance. Great attention must be paid to make a proper allowance for the set of the stream, which in clear weather can easily be ascertained by bearings of the different objects on Chausey.

At Night, when Chausey light is sighted, steer for it on a S.W. $\frac{1}{2}$ S. bearing until within 2 miles of the Chausey group, and then keep to the westward in order to round the rocks at that distance. When abreast the west end of the group, haul to the southward, taking care, however, not to approach the rocks within 2 miles, and when the light bears E. $\frac{3}{4}$ N., keep it so, and it will lead midway between the Sauvages, the Minquiers, and the French coast clear of all danger, until the light on cape Frehel is seen, which ought then to bear about W. $\frac{3}{4}$ S. With these two lights in sight, a position may be maintained off St. Malo so as at daylight to be in a fair way to enter the Rance.

To St. Malo from the Westward.—When bound to St. Malo from the westward, with southerly winds, the island of Ouessant and the French coast may be kept aboard; but with northerly winds and at night, a prudent distance should be maintained off shore until the flashing light on the Sept isles, and the fixed light on the Héaux rocks are made out. With the assistance of these lights, a departure may be taken from about 4 miles to the northward of the Héaux, and a S.E. $\frac{1}{4}$ E. course steered for 33 miles, to pass to the northward of the Roc'h ar Bel and the

northern reef of the Horaine ledge, and to cross the meridian of cape Frehel about 6 miles to the northward of the cape. The vessel will then be in a fair position to run for the entrance of the Rance either through the Décollé passage or Grande Porte channel according to the state of the wind and tide.

This route may be followed either on the ebb or flood stream, with the wind between N.N.E., round westerly, and South, but if between S.W. and South, it will be better, as soon as cape Frehel light bears S.E. by S. to steer S.E. $\frac{3}{4}$ S., to give the cape a closer berth. With a fresh fair wind a tolerably fast sailing vessel leaving the meridian of the Héaux lighthouse at the commencement of the flood, or 5 hours before high water at St. Malo, may, at the springs, enter the Rance at high water, although the distance be about 48 miles; but with a foul wind it will take two floods to make the passage.

With a beating wind it will be better to wait for the commencement of the flood, making short tacks in sight of the Héaux lighthouse, and then stretch into the channel between the Barnouic ledge and the Roc'h ar Bel. The boards in this channel should not exceed 2 miles in length, but when to the eastward of the Horaine ledge, they may be extended without fear to 7 or 8 miles. By following these directions, cape Frehel will be made towards the latter part of the flood, and the vessel may then be anchored or hove to under shelter of the cape during the ebb. Weigh as soon as the flood makes, and continue working up so as to reach, at about half flood, the entrance of one of the channels leading into the Rance.

If bound to Granville, the above directions should be followed, giving cape Frehel a berth of about 4 miles to avoid the Catis and the Vieux bank. Leaving the meridian of Héaux lighthouse at the beginning of the flood, that stream will take a vessel a little to the northward of Cezembre, when, if the wind is moderate, she can anchor, or make long boards to the eastward to counteract the influence of the ebb.

Directions from St. Malo through Cotentin Passage.

—Vessels leaving St. Malo intending to proceed round the west end of Chausey and through the Cotentin passage, should be clear of the island of Cezembre or the Grande Conchée in time to enable them to enter the passage with the first of the north-east stream, which will be at $3\frac{1}{2}$ hours before high water at St. Malo.

From about a mile to the northward of the Grande Conchée, steer about N.E. $\frac{3}{4}$ E., and the vessel will pass about 2 miles to the north-west of the Rochefort, and 4 miles to the south-east of the Sauvages, if a proper allowance be made for the set of the stream. When within

3 or 4 miles of the Corbière (the high remarkable rock lying at the south-west extreme of the Chausey group), steer to pass about $1\frac{1}{2}$ miles to the westward of the Rondes de l'Ouest, clear of Corbière bank. Round the north-west end of the group at the same distance, passing about 2 miles south-east of the Ardentes, and when the beacon on the summit of Gros Mont is in one with the Enseigne beacon, S. by W. $\frac{1}{4}$ W., steer to the eastward to bring Etat beacon in line with the beacon on the Huguenan, S. by W. $\frac{3}{4}$ W.; this latter mark will lead between the Shamrock knoll and the Marié ledge, when continue to the northward as before directed, endeavouring to run through the Race at the last of the south-western stream.

If after the first quarter flood, and unable to weather the west end of Chausey, bear up and pass round the eastern end. Granville church in line with the northernmost chimney of the south-western barrack will keep the vessel half-a-mile to the northward of the Videcoq rock; and Coutances cathedral in one with Mont Martin church N.E. by E. $\frac{1}{4}$ E. will lead between the Haguet and Admiralty banks.

From St. Malo through La Deroute Passage.—Vessels of large draught bound to any of the eastern ports in the Channel or the North Sea, leave St. Malo road as soon as the flood begin to slack; and with a fair wind, when clear of the channels leading out of the Rance, they pass to the westward of the Minquiers and the islands of Jersey, Guernsey, and the Casquets. With the wind between South and West this distance might be shortened by those acquainted with the navigation, by running through La Deroute passage and the Race of Alderney; for a vessel averaging 7 knots will, in 6 hours after leaving St. Malo, reach the middle of the passage, and thence steering for the Race may, with a fresh fair wind, stem the remainder of the south-west stream. The Race would then be entered a little after the commencement of the north-east stream. French sailing vessels generally adopt this route, but to ensure entering the Race on the slack or last of the south-west stream, they wait at anchor for a leading wind under the isle of Ehbians.

From St. Malo to the Westward.—The precautions to be taken when leaving Granville for cape Frehel have been already given in page 366. When bound round Ouessant from St. Malo, from a position about 5 or 6 miles to the northward of cape Frehel, a N.W. course should be shaped to enter the channel between the Barnouic ledge and the lighthouse on the Héaux. This course continued 17 miles westward of the meridian of the lighthouse will place a vessel 10 miles to the northward of the Sept isles and clear of all danger.

ÎLE des EHBIENS, about a mile in circumference, lies at the head of the deep bight formed between St. Malo and cape Frehel. It is surrounded by high rocks, and near its centre there is a large conspicuous tower which may be recognised from a great distance. It is joined to the shore at low water by a bank of sand which borders the coast from the entrance to St. Briac to St. Cast point.

Close to the south end of Ehbiens there is a well sheltered grounding place, much frequented by coasting vessels of about 10 feet draught, which await here for favourable winds when bound from Granville or St. Malo to the eastern ports in the channel and intend passing to the westward of the Minquiers and Jersey. It is formed by a natural causeway of shingle, which is always uncovered and unites the south-west extreme of the island to some high rocks lying 2 cables to the south-west. The bottom is composed of muddy sand and seaweed, and dries 7 or 8 feet above the lowest tides, which rise from 28 to 35 feet above it at the springs, and 18 or 19 feet at the neaps. The best place for grounding and sheltered from all winds, is about half a cable from the south end of the island with Agot island entirely shut in by the south-east extreme of Ehbiens.

Directions.—When running for the grounding place at the south end of Ehbiens, as soon as the island is made out steer to pass about $1\frac{1}{2}$ cables eastward of the Haches, a ridge of rocks, some of which are always uncovered, extending half a mile in a N.E. direction from its northern point. When the tower bears N.W. haul close round the south-east point of the island and anchor, or if necessary run the vessel on the beach. If obliged to beat in, be careful to avoid a half-tide rock lying a cable eastward of the high rocks at the south end of the causeway.

PORT de St. BRIAC.—This little tidal harbour is difficult of access, and should never be attempted without a pilot. It is situated at the entrance of a narrow valley $1\frac{1}{2}$ miles eastward of Ehbiens and about three-quarters of a mile southward of the high projecting point of Haye. The entrance, 2 cables wide, is formed between the south end of Perron isle and a beacon erected on the extremity of a rocky ridge extending in a northerly direction from the peninsula of Lancieux.

The rock on which this beacon is placed dries 15 feet at the lowest tides, and in entering the harbour a vessel should steer to pass about half a cable northward of it to avoid some small rocky heads lying a full cable westward of the south end of Perron; the highest of these heads which is also the westernmost, uncovers 12 feet at the lowest tides.

The channel into the harbour narrows considerably half a mile within the beacon at the entrance, and a vessel will have to pass between rocky heads, marked by beacons, the highest of which uncovers 19 feet. The

streams run with great strength, both in the harbour and in this channel, which is exposed to a heavy sea when it blows hard from the north-westward. The pilots place vessels in the middle of the harbour, with their heads in the direction of the ebb stream, N.N.W. of the town of St. Briac, on a bottom of sand and mud, on which the tides rise from 20 to 26 feet at springs and 12 to 13 feet at neaps.

There is a little bight formed in the northern part of the harbour, in which the bottom is of soft mud, and where vessels lie sheltered from the streams and all winds; but if of more than 13 or 14 feet draught they will be neaped two or three days.

RIVIÈRE LARGUENON.—Vessels capable of taking the ground will find shelter from strong easterly winds on the eastern shore of the bay formed at the mouth of the Languenon river. They should be placed abreast an old convent, with St. Jacut windmill bearing S.E., and Ehbiens islet shut in by Chevet point. The tides rise here from 19 to 26 feet at the springs, and $9\frac{1}{2}$ feet at the neaps.

The river is navigable up to Plancoet at the springs for vessels of about 9 feet draught.

Les BOURDINOTS are two small rocky ridges, one lying 6 cables and the other $1\frac{1}{10}$ miles, E. $\frac{1}{4}$ N. from St. Cast point. The easternmost ridge, on which there are 34 feet at the lowest tides, is only dangerous when blowing hard, but the westernmost, the highest rock of which dries 7 feet, must be carefully avoided. A red buoy is moored about a third of a cable E.N.E. of the westernmost ridge.

The marks for the latter rock are the ruins of Chesne windmill touching the west side of the Bec-Rond rock, W. by S. $\frac{3}{4}$ S., and St. Jacut windmill in line with the summit of the Columbière islet, lying half a mile to the westward, of Ehbiens, S. $\frac{1}{2}$ E. The Grande Conchée kept well open to the northward of Cezembre, or Tertre Morgan windmill in sight to the northward of St. Cast peninsula, West, will lead to the northward of both ridges.

POINTE de ST. CAST, lying 4 miles to the S.S.E. of cape Frehel, is high and nearly perpendicular on all sides. The approach to it is made dangerous at low tide by the Bourdinots, and also by low water rocks, which extend 3 cables from the foot of the point, and by a small sand bank, named Chelin, with only 10 feet water, lying N. by E. $\frac{1}{2}$ E. nearly half a mile from the point.

ANSE de ST. CAST.—To the southward of St. Cast point, in front of the village of Lille St. Cast, the coast forms a small bay, which affords to vessels capable of taking the ground good shelter from westerly

winds. The bottom of the bay, at three-quarters of a cable from the land, is composed of muddy sand, on which springs rise from 24 to 30 feet, and neaps about 15 feet.

Directions.—In approaching this grounding place give St. Cast point a berth of 4 cables when rounding it, and when the village bears west, steer for it, not approaching within a cable of the Bec-Rond rock.

Teignouse point, the first to the southward of cape Frehel, in line with La Latte point will lead a little northward of the Chelin bank, and between St. Cast point and the Bourdinots. A vessel will be eastward of this danger as long as the ruins of Chesne windmill are well open eastward of the Bec-Rond rock; and to the westward by keeping the mill open westward of the rock.

BAIE de la FRENAY, formed between St. Cast and La Latte points, affords good shelter with off-shore winds, but is quite exposed to those from the N.E. The entrance is 2 miles wide, and thence the bay trends $3\frac{1}{2}$ miles in a S.W. by W. direction to its head.

The surrounding land of this bay is high, and its northern shore free from danger. The holding ground is good, and the best anchorage is in $4\frac{1}{2}$ to 5 fathoms, about half a mile off La Cierge point, with cape Frehel lighthouse seen between the latter point and La Latte fort. The only precaution to be used in taking up a berth is to make allowance for the fall of tide.

Vessels under $9\frac{1}{2}$ feet draught can cross the high bank, which dries out upwards of 2 miles from the head of the bay, and reach the beaching places of Portmieux and Port-à-la-Duc. Both are situated on the western shore, the first behind, and the latter about a mile to the south-west of Muret point.

ANSE des SEVIGNÉS, situated between La Latte point and cape Frehel, has many dangers in it, and should not be run for as a place of shelter in heavy weather from the S.W., on account of the great overfalls in it, caused by the steepness of the coast, and the violent squalls off the land.

Banc de l'Etendrée lies in the northern part of Sevigñés bay, and some parts of it are nearly awash at the lowest tides. It is about three-quarters of a mile long in an E.S.E. and W.N.W. direction, and a quarter of a mile broad, and its western end is joined to the Etendrée rock, which uncovers $14\frac{1}{2}$ feet at the same period.

Basses de la Latte and Basse Raimonde.—Besides the above rock in Sevigñés bay there are two others, named Basses de la Latte and Basse Raimonde, which render the approach to within a mile of

this rugged and precipitous coast very dangerous, except to the fishermen, who congregate here occasionally in great numbers. The Latte lies N.N.E. $\frac{1}{4}$ E. a third of a mile from the fort on La Latte point, and uncovers a foot at the lowest tides; the Raimonde lies N.N. W. $\frac{1}{4}$ W. 4 cables from the same fort, and uncovers 9 feet. A vessel will pass to the north-east of the Latte by keeping St. Jacut mill well open of St. Cast point.

CHAPTER X.

CAPE FREHEL TO LES HÉAUX LIGHTHOUSE.

 VARIATION IN 1882.—19° 0' W.

CAPE FREHEL.—This promontory is the northern extreme of an elevated narrow neck of land, a mile in length, lying nearly 12 miles westward of St. Malo; S.S.W. $\frac{1}{4}$ W. 30 miles from the south-west extreme of Jersey; and S.E. $\frac{1}{4}$ E. $33\frac{1}{2}$ miles from the Héaux lighthouse. It is bordered on all sides by steep perpendicular cliffs, about 150 feet high, and in clear weather may be seen from a distance of 15 or 18 miles. On the summit of some level land near its extremity are two towers, 113 feet apart, the southern of which, 72 feet high, is the lighthouse, 550 yards S.S.W. $\frac{1}{4}$ W. from the extremity of the cape.*

LIGHT.—The lighthouse on cape Frehel exhibits a white light of the first order, which *revolves every half minute*. The light is elevated 259 feet above the level of high water, and is visible in clear weather 24 miles; in ordinary weather the eclipses will not appear total within the distance of 12 miles.

AMAS-du-CAP, a large remarkable rock lying W. by N. $\frac{3}{4}$ N. 4 cables from the western extreme of cape Frehel, never covers, and when seen from the eastward or westward resembles a quoin with the point turned to the south.

To the westward of Amas-du-Cap are several rocky clusters lying about three-quarters of a mile off shore; the principal are, the Mouillée, which uncovers 13 feet, the Truie, nearly awash, and the Jars, which uncovers 12 feet at the lowest tides.

BAIE de ST. BRIEUC.—From cape Frehel the north-east end of Bréhat isle bears N.W. $\frac{1}{4}$ W. 29 miles, and between them is the extensive bay of St. Brieuc, both sides of which are much encumbered with rocks and shoals, and others lie in the offing. The land about the bay is lofty, and may be seen in clear weather at a distance of about 22 miles. The parts

* See Admiralty chart :—Channel islands and coast of France, No. 2,669 b; scale, " = 0·5 inch.

that will first appear, when bound from cape Frehel to the westward are, cape Erqui, Bien-Assis wood, Plouha point, and the small town of Plouzec. In very clear weather some of the summits of the central chain of the Bretagne hills will be visible, and among others the Mener-Bel-Air and the Mener-Bré; the former rises to the southward, and the latter to the south-west of the bay.

The high and steep point of Pleneuf juts out boldly from the land $3\frac{1}{4}$ miles W.S.W. of cape Erqui, and the coast between is generally low and exposed to the north-west; but the hills rise suddenly a short distance from high water mark and unite with the high lands in the interior; Bien-Assis wood is on their summit and may be recognised at a great distance off. The Verdelet, a conical shaped islet, lies 2 cables to the north-west of Pleneuf point.

The western coast of the bay is indicated at night by the *fixed* white light on the Héaux de Bréhat rocks, and in the day by the Creach-ar-Maout hill, which rises about 3 miles S.S.W. of the light. This hill abruptly terminates to the northward the high land separating the river Pontrieux from that of the Tréguier; on its summit is a guard-house and close to it an old semaphore.

CAUTION.—As all the dangers lying between cape Fréhel and Bréhat isle, with the exception of Maurice patch, the Barnouic and Douvres ledges, rise from soundings of less than 18 fathoms at low water, the prudent seaman will at night or in thick weather keep without that depth at this time of tide.

PLATEAU des ROCHES-DOUVRES.—This dangerous rocky ledge, the outermost of the off-lying dangers fronting St. Brieuc bay, occupies a space $3\frac{1}{2}$ miles long N.W. and S.E., and $2\frac{1}{2}$ miles wide, and from it rise a group of 12 rocky heads which never cover. The north-west edge of the ledge lies N.E. by E. $\frac{1}{4}$ E. 15 miles, and the south edge E. by N. $\frac{3}{4}$ N. 16 miles, from Héaux lighthouse.

LIGHT.—The highest head of the Plateau, whose summit is about 9 feet above the highest tides, is situated in the middle of the group, and marked by a white iron lighthouse, whence, at an elevation of 180 feet above high water, is exhibited a white light showing a bright *flash* every *five seconds*, and visible in clear weather from a distance of 21 miles. From the lighthouse Gautier rock on Barnouic ledge lies S.S.W. 5 miles.

Fog Signal.—During foggy weather a bell is sounded at intervals of three seconds.

PLATEAU de BARNOUIC.—About 13 miles E. by N. of the Héaux lighthouse, and N.E. $\frac{1}{2}$ E. 9 miles from the beacon on Horaine rock, are the Barnouic and Gautier rocks, situated near the middle of a dangerous

rocky ledge, named Plateau de Barnouic, the southern edge of which lies E. $\frac{1}{2}$ N. from the lighthouse. The Barnouic rock of conical form, uncovers 23 $\frac{1}{2}$ feet at the lowest tides, covers 2 $\frac{1}{2}$ hours before high water springs, and is awash at high-water neaps. The Gautier bears W. $\frac{1}{4}$ N. three-quarters of a mile from the Barnouic, uncovers 14 feet at the lowest tides, and is awash at low-water neaps.

This ledge extends about 1 $\frac{1}{4}$ miles to the eastward, the same distance to the southward, 3 miles to the westward, and 2 miles to the north-west of the Barnouic, and the sea occasionally breaks over its whole extent. The most westerly rocky patches on it, (one of which has only 3 feet water) lie E. by N. $\frac{3}{4}$ N. 11 $\frac{1}{4}$ miles from Héaux lighthouse.

The Douvres and the Barnouic ledges are separated by a channel 2 $\frac{1}{2}$ miles wide, carrying a depth of 20 to 30 fathoms. It should if possible, however, be avoided by a sailing vessel, as the streams set with great strength over both ledges. If forced to pass through it, endeavour to keep nearer the Douvres than the Barnouic. A vessel will keep to the westward of both these ledges by not bringing Héaux lighthouse more westerly than S.W. by W.

Basse Maurice is a small rocky patch from which the Héaux lighthouse bears W. $\frac{1}{2}$ S. nearly 7 miles; the signal station on Bréhat isle S.W. $\frac{1}{4}$ S. nearly 8 miles; the guard-house on Creach-ar-Maout hill is in line with the Louet rock, W. by S. $\frac{1}{2}$ S.; and Plouha point is a little open to the westward of the beacon on the Horaine, S. by W. $\frac{1}{2}$ W. The depth is never less than 42 feet on this shoal, but it should be avoided in bad weather, as a heavy sea runs over it during a weather tide.

Roc'h-ar-Bel.—This shoal patch of 20 feet lies at the north-east extreme of the great rocky flat which, extending 5 miles from the coast, separates the entrances of the rivers Pontrieux and Tréguier, and of which the Héaux rocks form a part. From it the guard-house on Creach-ar-Maout Hill bears W. by S. $\frac{1}{4}$ S. and is in line with the Sark rocks; and Héaux lighthouse bears W. $\frac{1}{2}$ N.

The lighthouse kept on a West bearing will lead to the south-east of the Maurice patch, to the north-east of the Roc'h-ar-Bel, and also of the Carec-Mingui; this latter is a rocky patch of 11 feet, lying the third of a mile to the westward of the Roc'h-ar-Bel.

PLATEAU de la HORAINÉ.—Extensive rocky ledges, lying in general east and west direction, extend 4 or 5 miles to the east and south-east of Bréhat isle, and on them are several rocky heads which dry at low water. The northernmost ledges are named the Horaine and the Échaudés, and the southernmost the Men-Marc'h and the Ringue-bras, and between them are navigable channels leading to Bréhat road. Numerous banks of sand, under the general name of Bancs de Sable, extend 4 $\frac{1}{4}$ miles in a S. by E.

direction from their eastern end, and on some of them the depth is as little as $2\frac{1}{2}$ fathoms at low water.

La Horaine is a rocky head, with a beacon on it, lying about a mile within the northern extreme of the Horaine ledge, and bearing S.E. by E. $\frac{1}{2}$ E. $6\frac{1}{2}$ miles from Héaux lighthouse, and E.N.E. from the signal station on Bréhat. It uncovers 22 feet at the lowest tides, is awash about $2\frac{1}{2}$ hours before high water, and from it the pyramid on the Ar-Morbic rock is seen a little open westward of St. Michael chapel (Bréhat isle); and St. Barbe windmill is midway between two of the highest summits of St. Riom isle.

The flood stream sets strong over this rock during the springs.

Basses du Nord are the most northern patches on the Horaine ledge. The shoalest spot, 10 feet, lies N.E. $\frac{3}{4}$ E. three-quarters of a mile from the beacon on the Horaine, and S.E. by E. $\frac{3}{4}$ E. 7 miles from the Héaux lighthouse.

Basse du Sud Est is a rocky patch, with only 8 feet over it lying $1\frac{1}{2}$ miles S.E. by E. $\frac{1}{2}$ E. of the beacon on the Horaine. From the patch the beacon is in line with the Héaux lighthouse, N.W. by W. $\frac{1}{2}$ W.

PLATEAU des ÉCHAUDÉS is the rocky ledge lying to the south-west of the Horaine, and the highest rock on it, named the Échaudés, uncovers $8\frac{1}{2}$ feet at the lowest tides. This rock lies near the southern part of the ledge, and from it the guard-house on Creach-ar-Maout hill is in line with the northern extreme of Bréhat isle W.N.W.; the pyramid on the Louet rock is in one with the southern fall of the hillock on which St. Michel chapel stands, West a little southerly; and St. Barbe mill is a little open eastward of the summit of St. Riom isle, S.W. $\frac{1}{4}$ S.

Another rock, the Pain de Bray, uncovers only 2 feet. It lies on the north-west part of the ledge, in the direction of the Chandellier (a large rock lying off the north-west point of Bréhat isle), seen between the Grand and Petit-Azen. These latter rocks lie off the north point of Bréhat; the former uncovers 27 feet, and the Petit-Azen 15 feet at the lowest springs. The Petit-Azen has a stone beacon on it.

PLATEAU de MEN-MARC'H lies to the south-east of the Horaine, and between them is a channel leading to Bréhat road. This ledge is about 3 miles long E.N.E. and W.S.W., and $1\frac{1}{4}$ miles broad in its widest part, and the only rocky head seen on it at the lowest tides is named the Men-Marc'h, which then uncovers only 2 feet, and is at all times dangerous, even at high water, on account of the eddies in its vicinity. Numerous shoal patches lie to the westward of this rock.

PLATEAU du RINGUE-BRAS, the next ledge to the southward of the Men-Marc'h, is 3 miles long, East and West, and about a mile wide at its broadest part, which is towards its eastern end, and

between them is another channel leading to Bréhat road. The Caïn ou Ringue-bras, the highest head on this ledge, lies near its eastern extreme, and uncovers 6 feet at the lowest springs.

Directions.—Vessels bound from the westward to any of the ports in St. Brieuc bay, or to St. Malo or Granville, generally pass between Barnouïc and Horaine ledges. This channel is 7 miles wide, the streams follow its direction, and the only danger in it is the Maurice patch, which, as before stated, need only be avoided in bad weather.

If intending to use this channel, steer so as to pass within 4 miles of Héaux lighthouse, but do not bring it more easterly than S.S.E. to avoid the dangers westward of it. When eastward of its meridian it may be brought to bear W. $\frac{1}{4}$ N., but not more northerly, until the guard-house on Creach-ar-Maout hill is in line with the Sark rocks, W. by S. $\frac{1}{4}$ S. The vessel will then be eastward of the Roc'h-ar-Bel, and the lighthouse may be brought on a W. $\frac{3}{4}$ N. bearing, but not more northerly, and it will lead between the Maurice and the Horaine.

When bound from the south-east, a vessel will be in the middle of this channel when the Héaux lighthouse bears W. $\frac{3}{4}$ N., and it will be necessary to bring it on this bearing before she is abreast the shoals on the northern part of the Horaine; these, however, will be avoided by not crossing the line on which St. Barbe mill is in one with the highest summit of St. Riom isle, S.W. $\frac{1}{4}$ W. before the old mill on Bréhat isle (a mill without sails) is quite open to the westward of the pyramid on the Ar-Morbic rock, or the Héaux rocks appear quite detached from the Sark rocks. To avoid the Roc'h-ar-Bel, the lighthouse must not be brought more northerly than W. $\frac{1}{4}$ N. When to the westward of the meridian of the Héaux, and within 5 or 6 miles of the lighthouse, do not bring it more easterly than S.S.E. to avoid the dangers to the westward.

Tides.—Between Barnouïc ledge and Maurice patch, the flood stream sets to the S.E. by S., and ceases about an hour after high water on the shore at Bréhat isle; its greatest velocity, about $4\frac{1}{2}$ knots, is about the time of half flood. The ebb runs in the opposite direction and ceases about 5 hours before high water on the shore; its strength is nearly equal to that of the flood. At a mile to the northward of the Héaux lighthouse, the flood sets S.E. by E., the ebb N.W. by W., with about the same strength. The whirls or eddies occasionally met with in the channel between the Horaine and the Barnouïc are strong, but not dangerous; the most considerable is produced by the Maurice.

ROCHES de ST. QUAY.—This rocky group, fronting the western coast of St. Brieuc bay abreast St. Quay point, covers a space of nearly 5 miles long, in a S.E. by S. and N.W. by N. direction, and $2\frac{1}{2}$ miles wide; its south-east extreme being 4 miles from the shore in an E.S.E.

direction from the steeple of Étables church, and its north extreme lying with the steeple of Plouha church nearly in line with the rocks terminating Bec-de-Ver point, W.N.W.

The principal rock, named Harbour isle, is a large, round, steep, and isolated islet, with a lighthouse erected on it, lying to the north-west of the other rocks, and one mile E. by N. $\frac{3}{4}$ N. from St. Quay point. Only 10 or 12 heads cover on this part of the group; but those on its south-eastern part all cover, with the exception of the Houessé rock (the summit of which is $35\frac{1}{2}$ feet above the lowest tides and only covers at high water great springs), and of the Ronde and the Longue rocks, which are not covered at high-water ordinary neaps; the former dries 25 feet and the Longue 26 feet at the lowest tides. The Ronde is marked by a black beacon, and the Longue by a stone tower with its north-east face painted white.

The south-eastern head of the group, named the Caffa, lies E. $\frac{1}{3}$ N. about $4\frac{1}{2}$ miles from the eastern pier head of Port Binic, and uncovers only 2 feet. The highest head of the Comtesses kept in line with cape Frehel, or Étables and Plourhan church-steeple in one, bearing N.W. by W., lead to the southward. The southern rocks of the group, the Roselière and the Caffa, are marked by a black buoy on the former, and a red buoy on the latter, but they are often washed away.

Plateau des Hors.—This ledge lies to the eastward of the principal rocks of the St. Quay group, and is separated from them by a channel 3 cables wide, bounded on the west by the Petit Aubert (a rock which uncovers 12 feet), and on the east by a patch named Grande Place, which is nearly awash at the lowest tides. The north-east rock of the ledge uncovers 4 feet, and the marks for it are, the Rohein rock seen between Turquet mill and the high lands of Erqui, S.E. by E. $\frac{1}{4}$ E., and the eastern peak of Mener-Bel-Air mountain in line with Pâtur point, S. $\frac{1}{2}$ W. A bell buoy marks the northern end of this plateau.

LIGHT.—The lighthouse on Harbour isle, the principal rock of the St. Quay group, exhibits a *fixed* white light at an elevation of 49 feet above high water. The light is dioptric and of the fourth order, and in clear weather is visible from a distance of 10 miles.

From this lighthouse the eastern edge of the Sable banks, bear N.N.E. distant 9 miles; the Grand Léjon rock E.N.E. $7\frac{1}{2}$ miles; and the Petit Léjon E. $\frac{1}{2}$ S. $7\frac{3}{4}$ miles.

Fog Signal.—During thick or foggy weather, a trumpet will be sounded in the following order—fourteen blasts at intervals of *one second*, an interval of *six seconds* a double blast, another interval of *six seconds* followed by fourteen blasts.

GRAND and PETIT LÉJON are two rocky ledges lying nearly midway between cape Frehel and Bréhat isle. The highest head of Grand-Lejon, uncovers 23 feet at low water, and covers about $2\frac{1}{2}$ hours before

high-water springs. It lies N.W. by W., about 84 miles from cape Frehel lighthouse; E.N.E. $7\frac{1}{2}$ miles from that on Harbour isle, and S.E. $\frac{1}{4}$ S. $19\frac{1}{2}$ miles from that on the Héaux; and from it the steeple of Plourhan church is in line with St. Quay point, and also in line with the lighthouse on Harbour isle, W.S.W. whilst Turquet mill is in one with the most southern of the highlands of Erqui, S.S.E. $\frac{1}{4}$ E. Some shoal patches of 4 to 15 feet, named the Bouillons, lie nearly half a mile to the north-eastward of this ledge; and others, named Basses du Sud-Est, with $2\frac{1}{2}$ fathoms least water on them, lie three-quarters of a mile to the southward.

The highest head of the Petit-Léjon bears S. $\frac{1}{2}$ E. $3\frac{1}{2}$ miles from the Grand Léjon, and uncovers only 9 feet. From it the northern mill of Plevenon is in line with the northern face of the Robinet rock, S.E. by E., and Turquet mill is on with the northern part of Lahoussaye point, S.E. by S. A black bell buoy is moored on the west side of Petit-Léjon.

LIGHT.—From the tower on Grand Léjon rock a light is exhibited at an elevation of 52 feet above high water, and 76 feet above the rock.

The light is alternately fixed and flashing at intervals of twenty-five seconds; it shows red through an arc of 43° , between the bearings of N. 34° E. and 77° E., covering the dangers included between Caffa shoal and St. Quay rocks; it is obscured through an arc of 67° , between the bearings of N. 9° E. and N. 58° W., covering the dangers included between Rohein rocks and Grande Livière; in all other directions, northward and southward, it shows white.

The fixed white light should be visible in clear weather from a distance of 12 miles; the flashing white light 17 miles, the fixed red light 8 miles; and the flashing red light 12 miles.

Fog Signal.—A bell is sounded in foggy weather.

Directions.—At night, by keeping without the range (10 miles) of the light on Harbour isle, a vessel, when turning to windward, will not borrow too close to the Grand-Léjon; it will be prudent, however, to sight the light once when coming from the westward, in order to determine her position, so as not to borrow too close to the Minquiers. She should only stand to the southward when it bears between S.W. by S. and W.S.W.; in every other direction she should keep beyond its range.

Tides.—The tidal streams run with great strength in the vicinity of the Grand and Petit-Léjon, and the sea is heavy there in bad weather.

Le Rohein and Les Comtesses are two rocky ledges, the first about 5 miles and the former $3\frac{1}{2}$ miles N.W. by W. of cape Erqui; a vessel should on no account pass between them at low-water springs. The two westerly heads of the Comtesses lie close together, and never cover.

Le Rohein.—This rock, lying at the south-west extreme of the Rohein ledge, is quite as high as the westerly heads of the Comtesses, and from its isolated position is easily recognized from some distance.

Basse des Daouelins is a dangerous patch forming the north extreme of the Rohein ledge, and from the least water on it, 3 feet, the extreme of cape Frehel is touching the south side of the Rohinet rock, E. by S. $\frac{1}{4}$ S. and Pâturage point is a little open to the westward of the Rohein, S.W. $\frac{1}{4}$ S.

Basse des Comtesses is a small ledge about a cable long, and its highest head, which uncovers 3 feet, bears N. $\frac{1}{4}$ E. distant half a mile from the highest rock of the Comtesses; from it this latter rock is in line with the eastern face of the Verdelt rock, S. $\frac{3}{4}$ W.

PLATEAU des JAUNES lies $1\frac{1}{2}$ miles northward of Pleneuf point, and S.S.W. nearly 2 miles from the Comtesses; the highest rocks on it never cover. There is but little water between this ledge and the Verdelet rock, but coasters pass between by keeping Garenne mill exactly in line with Lahoussaye point, E. $\frac{1}{4}$ S.

Le Guyoméré and Les Écarets.—The soundings are shallow to the distance of a mile from the shore between Pleneuf point and cape Erqui, and there are several rocky ledges which nearly bar its approach at low water. The highest of these are, the Guyoméré, the highest head of which uncovers 16 feet, and the Écarets, which uncover 2 feet at the lowest tides. The latter rock bears N.N.W. $\frac{3}{4}$ W. nearly a mile from Carouel point (on which there is a stone windmill), and from it Turquet mill is in line with the south extreme of the steep coast near Lahoussaye point, E. by S. $\frac{1}{2}$ S., and the north extreme of Bien-Assis wood is in one with a country house standing on the brow of a hill a little to the westward of a remarkable white spot in the steep declivity of the coast.

Plateau des Portes d'Erqui.—This ledge, lying about $1\frac{1}{2}$ miles to the westward of cape Erqui, has four rocky heads on it which uncover from 26 to 29 feet at the lowest tides. The two eastern heads are named the Evette and the Izard, the latter being marked by a beacon.

Pierres du Banc are two rocky patches lying $3\frac{1}{4}$ miles to the E.S.E. of the Petit Léjou. There are never less than about 3 fathoms water on them, but they are dangerous when it blows hard, as there is then a heavy sea over them on a weather tide. They lie close together, with the Verdelet rock a little open to the westward of Tournemine mill, S.S.W. $\frac{3}{4}$ W., and the summit of the Grand-Pourier rock between the Rohinet rock and the chapel on St. Michel islet, S.E. $\frac{1}{2}$ S.

Les Landas are two rocks rising from the southern part of a ledge, 4 cables in extent, east and west, and on which there are only 5 to 8 feet

at the lowest tides; the eastern rock is then awash, and the western is uncovered 2 feet.

These rocks lie midway between the Pierres-du-Banc and the Grand-Pourier, and from them the lighthouse on cape Frehel is seen between the Amas-du-Cap and the Bonnetot rock, (which lies three-quarters of a mile eastward of the Landas and uncovers 20 feet), E.S.E.; and the chapel and mill of Pleherel is between the Rohinet and the Grand-Pourier, S.E. $\frac{1}{2}$ E.

Grand-Pourier, Rohinet, and Justières, are names given to the highest ledges of a rocky plateau, of which the south-western extreme bears N. by E. $\frac{1}{4}$ E, half a mile from cape Erqui; it extends $2\frac{1}{2}$ miles in a N.E. and S.W. direction, and is $1\frac{1}{2}$ miles broad in its widest part. The Rohinet never covers, and the eastern summit of the Grand-Pourier only covers at the highest tides. The Justières has a red buoy moored on its south-eastern edge.

Grande and Petite-Livière and two rocky patches lying to the north-westward of cape Frehel. The Grande-Livière, with 14 feet water on it, lies N.W. $\frac{1}{2}$ W. 3 miles from the cape, with the lighthouse nearly touching the south extreme of the Amas-du-Cap. A vessel will pass to the northward of this patch by keeping the summit of the Amas-du-Cap in line with the lighthouse; at night the light should not bear more easterly than S.E. $\frac{1}{2}$ S. Pleneuf point, in one with the low extreme of cape Erqui will lead half a mile to the westward; and the new spire of Plurien church in line with the summit of the Rénard rock, S.W. by S., will lead about 2 cables to the eastward. The Rénard never covers; it stands out in dark outline on the Bouche d'Erqui beach.

The Petite Livière, with only 9 feet on it, lies S.S.W. $\frac{1}{4}$ W. three-quarters of a mile from the Grande-Livière. When on this patch the lighthouse on cape Frehel bears S.E. by E. $\frac{2}{3}$ E. 3 miles, the summit of the Amas-du-Cap is in one with the most southerly of the two houses on the summit of the cape, and Garenne mill is in line with the western extreme of the islet on which stands the chapel of St. Michel, S.W. by W. A vessel will pass $1\frac{1}{2}$ cables eastward of a 13-feet patch, lying a cable eastward of the Petite Livière, by keeping the spire of Plurien church in line with the Rénard.

The COAST between cape Frehel and the little islet about 5 miles to the westward, called Bouche d'Erqui, is formed of high steep rocky cliffs, with the exception of a small sandy beach under the village of Pleherel. At $9\frac{1}{4}$ miles to the westward of cape Frehel is cape Erqui, a lofty promontory jutting out and terminating in a steep slope to the westward; the shore between it and the Bouche d'Erqui is bordered by a belt of rocks and shoals.



A Life Boat is stationed at Pleherel.

BOUCHE D'ERQUI.—This inlet is about a mile in extent, dries at low water, and its shore is formed of white sandy downs. About half a mile to the N.N.W. of Champ du Port point, the western point of the inlet, is the islet of St. Michel, which is joined to the coast at low water, and on which stands a chapel. This is the only place on this part of the coast where a vessel can run ashore with the hope of saving her crew. The vessel might even be saved if she were beached to the southward of Champ du Port point about an hour after high water.

Anchorage.—If windbound with strong northerly gales, some shelter might be found during the neaps by anchoring South of the Plate St. Michel rock, with the Rohinet rock nearly touching the eastern shore of St. Michel islet. The depths will here be from 19 to 22 feet over good holding ground of muddy sand.

RADE D'ERQUI.—Erqui bay is a small beaching place situated at the foot of the southern shore of the peninsula terminated by cape Erqui in front of the village of Erqui, which is built in the south-east corner of the bay. Vessels ground on a bottom about 16 feet above the lowest tides, and are sheltered from N.N.W., round easterly, to south. The south side of the bay is formed by the lofty point of Lahoussaye, which is prolonged to seaward by an islet and some rocks.

A jetty is constructed in the northern angle of the bay, at $1\frac{1}{2}$ cables westward of a little hamlet, named La Chaussée, and it affords safe shelter against westerly winds to vessels capable of taking the ground. The bottom at the foot of the jetty head, which should be left to port on entering, dries 13 feet above the lowest tides.

Anchorage.—Erqui road, lying close to the southward of cape Erqui, in front of Erqui bay, is the only anchorage on the eastern shore of St. Brieuc bay that will afford complete shelter from easterly winds. The holding ground is good, but it will be prudent to leave it, especially in the winter season, if the wind is likely to veer to the westward, or the weather threatens an approaching change.

CHENAL d'ERQUI is formed between the belt of rocks bordering the coast from St. Michel islet to cape Erqui, and the Grand Pourier, Rohinet, and Justières ledges. The depth is not less than $2\frac{1}{2}$ fathoms in the fairway of this channel at low-water springs, at which period it can only be navigated by small coasters in charge of local pilots; with a free wind vessels of large draught can pass through it from half flood to half ebb.

Directions.—Vessels prevented by easterly winds and the ebb stream from rounding cape Frehel, can remain under the lea of the cape till the

tide turns by making short boards between the following limits :—the Amas-du-Cap seen between the extreme of the cape and the lighthouse ; the Amas-du-Cap between two and three times its apparent breadth to the northward of the cape ; and Plurien church-spire between the Rénard rock and the eastern point of Bouche d'Erqui. This latter point is steep and high, whilst the Rénard, as before observed, never covers, and stands out in dark outline on the beach of Bouche d'Erqui.

Through Erqui Channel.—If surprised by strong easterly winds, between cape Frehel and St. Malo, a vessel will find excellent shelter in Erqui road by passing through the Erqui channel between half flood and half ebb. To this end, having rounded the cape, steer to the westward with the south end of the Amas-du-Cap touching the extremity of the cape, E. $\frac{3}{4}$ S., and it will lead to the northward of the Jars, Truie, Malicorne, and Mouillée rocks which lie off the coast between the cape and St. Michel islet ; the Mouillée, the highest and westernmost of these rocks, uncovers 13 feet at the lowest tides. Keep this mark on until the lofty and steep point of Pleneuf comes in sight to the W.S.W., and is in one with the rock forming the extremity of cape Erqui ; then steer to pass a good cable from this rock, and round into the road. The most dangerous part of the Erqui channel is when cape Erqui bears between S.S.W. and S. $\frac{1}{4}$ W. ; the vessel will then be abreast and to the southward of rocky patches which dry 5 feet at the lowest springs.

The Erqui channel may also be run for by passing between the patches lying between the Petite Livière and the Bignons rocks, which lie half a mile to the eastward of Justières ledge, when there is sufficient water over them (the depth is never less than 16 feet over any of them), and the sea does not break in their eddies. The leading mark through is the guard-house on Pleneuf point kept in line with the rock at the extremity of cape Erui, (the new telegraph, which stands a little inland of Pleneuf point, being at the same time clear of the summit of the cape) S.W. by W. $\frac{3}{4}$ W., until the extreme of cape Frehel is in one with the south end of the Amas-du-Cap, E. $\frac{3}{4}$ S., when proceed as before.

If running through the Erqui channel for any of the ports on the western coast of St. Briec bay, proceed as if bound for Erqui road, until the highest summit of the Comtesses rocks is in line with that of the Rohein, W. by N. $\frac{3}{4}$ N. By steering to the westward in this direction, or by keeping St. Michel islet in sight, and quite detached from Marre-aux-Rets point (the eastern point of the little bay immediately to the eastward of cape Erqui), it will lead northward of the Portes d'Erqui ledge ; the extreme of cape Frehel, kept in line with the large pointed rock at the foot of cape Erqui, will lead southward of this ledge, and northward of the Jaunes. After passing southward of the Comtesses, which are clear

of danger on this side, keep their highest summit in line with the Rohinet, E. $\frac{1}{4}$ N., and the vessel will pass southward of the Rohein and of the south-east extreme of the St. Quay rocks.

Through Les Landas Channel.—A vessel can also reach Erqui road by passing between the several rocky ledges in the offing. The first channel, when coming from the eastward, is between the Petit Léjon and the Pierres du Banc (page 412), and is practicable for vessels of the largest draught after the period of half flood. There are three sand-banks lying in it, but they are only dangerous from the heavy sea they occasion when it blows hard on a weather tide; the largest, on which there are $4\frac{1}{2}$ fathoms at low water, lies in the direction of Tournemine mill in line with the Verdelet rock, S.S.W. $\frac{3}{4}$ W.

In running through this channel keep Tournemine mill in one with the highest summit of the Comtesses bearing S. by W. $\frac{3}{4}$ W., until Turquet mill comes in line with Trois Pierres point, S.S.E. $\frac{1}{4}$ E. Follow this latter mark until within half a mile of cape Erqui, when steer for Erqui road. A vessel will keep to the eastward of the Petit Léjon by having the Verdelet rock open eastward of the summit of the Comtesses; she will also pass eastward of the Comtesses patch, by having Tournemine mill well open eastward of the Comtesses; and so long as Turquet mill is in sight eastward of Lahoussaye point she will not be too close to the eastern part of the Portes d'Erqui. The dangers on the eastern side of the channel will be avoided by not standing to the eastward of the line on which Turquet mill is just touching the high land of cape Erqui.

The Channel between Le Rohein and Le Petit Léjon may be taken when seeking shelter in Erqui road, either on the flood, or the ebb. The summit of the Comtesses kept in line with the south extreme of Bien-Assis wood, S. by E. $\frac{1}{4}$ E., will lead half a mile westward of the Grand, and 2 cables westward of the Petit Léjon. Steer with this mark on until Turquet mill is in one with Lahoussaye point, S.E. $\frac{3}{4}$ S., which will lead into the road.

In following this route before the period of half flood, care must be taken to avoid the Daouelins and Comtesses patches, and the Iazard rock on the southern side of the channel, and the Petit Léjon on the northern side; also, at low water and in bad weather, a 21-feet patch lying S. by E. $\frac{1}{2}$ E. three-quarters of a mile from the Petit Léjon.

The Channel between Le Rohen and Les Jaunes is sufficiently deep for vessels of moderate draught, even at low water, when seeking shelter in Erqui road, from easterly winds. In standing to the northward, cape Frehel lighthouse kept open to the southward of the summit of the Comtesses will clear the southern part of the Rohein ledge; and the lighthouse in line with the large pointed rock at the foot of cape

Erqui will clear the southern part of the Portes d'Erqui. In making the southern board, the lighthouse kept open of the northern extreme of cape d'Erqui will keep the vessel northward of the Jaunes; and Turquet mill well on with the steep coast which separates the beach of Erqui bay from the beach of the large bay to the southward will keep her northward of the Écarets rocks, which uncover 2 feet at the lowest springs. The old telegraph of Dahouet in line with Pleneuf point, S.W. by W., will lead northward of the Guyoméré and the Écarets, and between the Portes d'Erqui and the cape.

Tides.—It is high water, full and change, in Erqui road at 5 h. 59 m.; equinoctial springs rise 43 feet; ordinary springs $33\frac{1}{4}$ feet, and ordinary neaps about $24\frac{1}{2}$ feet.

The COAST between Pleneuf and Roselier points, which bear E. $\frac{1}{4}$ N. and W. $\frac{1}{4}$ S. of each other distant $6\frac{3}{4}$ miles, falls back to the southward and forms the head of St. Brieuc bay, in which are situated port de Dahouet, Anse d'Yffiniac, and port du Legué.

Several dangers front this part of the shore, of which the farthest in the offing are named the Daouet, Trois Têtes, Basse Herbaut, and the Trahillions. The Daouet and the Herbaut rocks are awash, and the Trois Têtes have only 2 feet over them at the lowest tides. The Trahillions form a rocky ledge, about three-quarters of a mile in extent, E.S.E. and W.N.W., at the edge of the bank, which, abreast Guettes point, dries more than a mile from the shore at low-water great springs; the ledge is terminated on the eastern side by a rock which uncovers 23 feet, and on the western by another which uncovers $8\frac{1}{2}$ feet.

A vessel will pass in the offing of these dangers by keeping Robinet rock in line with the highest head of the Jaunes, E.N.E.; and to the westward of the Trahillions, by keeping the northern tower of the new church of St. Michel (to the town of St. Brieuc), between the southern tower (on which there is a telegraph) of the same church and the most southern houses of the hamlet, named Sous la Tour. This hamlet stands in front of Cesson tower, at the foot of the high land which forms the left bank of the entrance to the river Legué.

PORT de DAHOUE.—The entrance to this little inlet, situated $1\frac{1}{4}$ miles to the south-west of Pleneuf point, is comprised between the shore and the pier-head, which on entering must be kept to starboard. The port is open to the north-west, but it affords good shelter to vessels that can take the ground. The bottom dries 13 feet above the level of the lowest tides abreast the pier-head; 18 feet in front of the western part of the quay; about 22 feet at the angle of the quay, and 24 feet near the mill sluice at the head of the port.

Directions.—When bound to port Dahouet from the westward, follow the directions given in (page 409) for passing between the Barnouic and Horaine ledges. With northerly winds the most direct route is through Bréhat channel, which should be taken at the commencement of the flood; this stream begins an hour sooner and runs with greater velocity in this channel than in the offing.

In running through Bréhat channel, when Paon point, the north extreme of Bréhat isle, is in line with the Héaux lighthouse, N.W. $\frac{3}{4}$ N., haul to the south-east, and steer with this latter mark on until the two mills of Lande Blanche are in line with Lemenez isle, West; the vessel will then be about one mile westward of the Sable banks, and a S. by E. course will lead between the Rohein and the St. Quay rocks.

When southward of the Rohein, which bears N. $\frac{3}{4}$ W. from the entrance of the port, the only dangers to be avoided are the Bignons, the Basse Godiche, and the Daouet rocks. The Bignons lie on the south-west edge of the Jaunes ridge, and uncover 24 feet; when they are awash there is plenty of water over the Godiche, and $10\frac{1}{2}$ feet at the entrance of the port. The Godiche is a small patch of 7 feet lying half a mile westwards of the Bignons, in the direction of the Petit Bignon a little to the southward of the summit of the Jaunes. The small steeple of Pleneuf seen over the downs, and open about half a point north of the steep coast to the northward of the point, will lead to the northward of the Daouet, which lies three-quarters of a mile W.N.W. of the entrance, and is awash at low water.

With the wind between S.W. and S.S.E. the vessel must pass to the eastward of the Horaine, after rounding which (page 409), take care she is not set too far eastward by the flood. When south of the Grand Léjon, in standing to the eastward, do not open the summit of the Comtesses to the westward of the south extreme of Bien-Assis wood, to avoid the Petit-Léjon; and in approaching the Rohein ledge, keep Guettes point well open westward of the Rohein rock, until the vessel is southward of the rock. In standing to the westward be careful not to approach too near the St. Quay rocks; Pâtur point keep open westward of Mener-Bel-Air mountain (at least double the apparent distance between its eastern and western peak), will lead a safe distance eastward of them, and when cape Frehel lighthouse is well open to the southward of the Comtesses, or Étables steeple bears W.N.W., she will be to the southward of their south-east extreme.

At Night, after rounding the Horaine, in order not to be set too far eastward by the flood, endeavour to keep in soundings of about 18 fathoms. The Sable banks and the Grand Léjon will be avoided by keeping the light on Harbour isle bearing between S.W. by S. and S.W. by W. $\frac{3}{4}$ W.

Tides.—It is high water, full and change, at port Dahouet at 6h. 5m. ; springs rise 32 feet, neaps 23½ feet. Springs rise at the foot of the western part of the quay, from 16 to 20 feet, neaps 5 to 6 feet.

ANSE D'YFFINIAC, formed between Pâturage and Cesson points, being filled with sand, should on no account be entered. An extensive bank of sand dries out 1½ miles from its entrance, but a vessel will keep well outside it by having the northern part of Bien-Assis wood in sight to the northward of the old telegraph of Dahouet.

PORT du LEGUÉ ou de St. BRIEUC is situate at the mouth of the river Gouet, the entrance to which is close to the northward of Cesson point, the north-west extreme of Yffiniac bay. The port can only be entered at springs, and is at all times difficult of access although well buoyed. The bottom between Cesson point and Sous la Tour hamlet dries 15 feet, the berths at the foot of the quay 20 feet, and those near the bridge 22 feet above the lowest tides. On the summit of Cesson point are the ruins of Cesson tower, which Henry IV. attempted to blow up after the wars of the League; it now serves as a landmark, and can be seen from a distance of 15 miles. The channel of port du Legué is marked by beacons and buoys, red on north and black on south shore.

LIGHT.—A *fixed* white light is exhibited from Aigle point, port de Légué; it is elevated 45 feet above high water, and is visible in clear weather 10 miles.

Directions.—When bound to port Legué follow the directions given in page 415 until abreast Rohein rock, then steer to the southward with Roselier and Cesson points in line S.W. by S. When within 2 miles of the former point steer towards Pâturage point until the northern tower of the new church of St. Michel, in the town of St. Brieuc, is seen between the southern tower (on which there is a telegraph) of the same church and the most southerly houses of Sous la Tour hamlet, which mark will lead to the entrance of the port.

Banc de Chatern and Les Gallettes rocks are the only dangers to be avoided when entering port Legué. The bank trends in a S. by W. direction from Roselier point and rests upon Chatern point, the south extreme of port Aurelle; it will be avoided by keeping the northern tower of the new church of St. Michel, in the town of St. Brieuc, between the southern tower (on which there is a telegraph) of the same church and the most southerly houses of Sous la Tour hamlet; this is also the mark for leading to the westward of the Trahillions. The Gallettes form a small ledge which lies 3 cables to the eastward of Cesson point, and uncovers 10 feet.

POINTE du ROSELIER, $1\frac{1}{4}$ miles N.N.E. of the entrance to port Legué, and 5 miles E. by S. of port Binic, is high and steep on its northern and southern sides, but its eastern side terminates in a gentle declivity.

If a vessel can take the ground, excellent shelter will be found close to the southward of this point on the northern shore of a little bay called port Aurelle, where she will be protected from all winds between South round westerly, and N.E. The bottom, which is of muddy sand, dries only 3 feet above the lowest tides, so that if about 14 feet draught she can run for shelter from two hours before to two hours after high water.

The COAST between Roselier point and Binic is high and steep, except abreast Rosaires beach, between Roselier and Pordic points, where the shore is always accessible to boats with off-shore winds. At $2\frac{1}{2}$ miles to the northward of Roselier point, and $3\frac{1}{2}$ miles eastward of Binic, the depth is 26 feet at the lowest tides.

From Binic the height of the coast lowers progressively, and trends in a N. by E. $\frac{1}{2}$ E. direction $3\frac{1}{4}$ miles to St. Quay point, which is steep, but much less elevated than the points farther north. The intermediate shore is inaccessible, except in the little bay of Portrieux, and on a beach half a mile southward of the bay. The bank bordering the coast dries out one mile abreast of Binic, but only one cable in front of Portrieux, and on it are several rocks, one of which, named the Four, never covers and is used as a leading mark for running between the St. Quay rocks and the coast. The southernmost of these is a rocky ledge with two heads named Ours-Seul, lying 4 cables from the shore and $1\frac{1}{4}$ miles to the north-east of port Binic; the southern head dries 8 feet, and the northern 6 feet above the bank. The Four lies N. $\frac{1}{2}$ E. nearly $1\frac{1}{4}$ miles from the Ours-Seul; and close to the westward of it is Fille rock, which dries 19 feet; whilst 2 cables to the southward is Noyes ledge, which dries 2 feet above the bank.

Le Petit-Gripet, Le Grand Gripet, and Les Equerrets, are three small rocky ledges lying abreast Rosaires beach, and dangerous to vessels borrowing too close to the shore.

The highest head of the Petit-Gripet uncovers about a foot at the lowest tides, and lies about half a mile from the shore, with Martin rock in line with the foot of Roselier point, S. $\frac{3}{4}$ E.; there are more than 14 feet water on this danger when the eastern extreme of the Martin is covered.

The Grand-Gripet, with 2 feet over it, lies N.N.E. nearly $1\frac{1}{4}$ miles from Martin rock, with the summit of that rock a little to the eastward of the principal house of a large farm on the high land.

The highest head of the Equerrets bears E. by S. $\frac{3}{4}$ S., 8 cables from the foot of Pordic point, and uncovers about a foot.

PORT de BINIC is situated about 5 miles N.W. by N. of Roselier point at the head of a little bay half a mile wide and open to the eastward. The entrance is between two stone jetties. The berths at the foot of the eastern jetty dry 17 feet, and those near the landing creek at the upper end of the port 25 feet above the lowest tides; those named l'Estacade, near the southern jetty, are the highest, and only used by vessels of small draught.

A mole extends from the shore 273 yards eastward of the eastern jetty, and forms with this jetty an outward port, the depth in which at high water is from 3 to 6 feet greater than in the port.

The outer port can be entered by vessels of about 10 feet draught at high-water ordinary neaps, and those of 14 feet can enter it from $1\frac{1}{2}$ hours before to $1\frac{1}{2}$ hours after high water springs. It affords shelter to vessels caught in St. Brieuc bay by strong winds from N.N.W. to E.N.E.; the sea, however, is then high at the entrance, and it will be necessary to enter at the moment of high water.

LIGHT.—A *fixed* white light is exhibited from the mole at port Binic; it is elevated 36 feet above high water, and is visible in clear weather 10 miles.

Directions.—When bound to port Binic, follow the directions given in (page 418) until abreast the Grand Léjon, when if the wind is between N.N.E. and W.S.W. a vessel, at springs, can pass between the coast and St. Quay rocks; if between N.N.E. and E.S.E. she can pass on either side of these rocks; but if between S.E. and S.W. she should keep eastward of them. With strong winds from N.E. to East a vessel should always pass to the eastward, but before venturing so far into the bay a calculation should be made that the tide has risen sufficiently high in front of the port (making a deduction for the 'scend of the sea), to prevent grounding.

If compelled by high winds from N.W. to North to run for shelter at springs in the outer port of Binic by passing between the St. Quay rocks and the coast, bring the Four rock in line with Ville Raout tower S. $\frac{3}{4}$ W. This mark will lead between the northern part of St. Quay rocks and St. Marc bank, and should be kept on until the vessel has arrived $3\frac{1}{2}$ cables N.E. by E. of St. Quay point, or the Mauve rock is in one with a large conspicuous white house in the middle of Plouzec village, N.W. by N. Steer to the south-eastward with the latter mark on until the Four is in line with the lofty spire of Pordic church, S.S.W. $\frac{1}{4}$ W., when follow this direction until the leading mark for the southern part of the channel comes on, viz., the Hergue and Pommier rocks in one, N. by W. $\frac{3}{4}$ W.; the latter is a remarkable large rock lying close to Plouha point; the Hergue is a

similar rock bearing N. by W. $\frac{3}{4}$ W. 6 cables from St. Quay point. In steering with the Four in one with Pordic spire, if the vessel is above 14 feet draught do not wait until the Hergue and Pommier rocks are in one, but leave that direction the moment the Hergue is in line with Plouha point.

The vessel, if not drawing more than 14 feet, can now either anchor in Portrieux road (page 423), or if the tide suit, she can continue steering S. by E. $\frac{3}{4}$ E. with Hergue and Pommier rocks in one, remembering that this mark leads over a shoal of 6 feet, named Basse Meridionale de la Rade; close to another of 8 feet, lying 3 cables N.W. of the 6 feet; and over a sand-bank, named La Traverse, which trends upwards of $1\frac{1}{4}$ miles in a S.S.W. direction from the southern part of St. Quay rocks, and on which the least water is 4 feet. When Étables steeple comes in one with that of Plourham, N.W. by W. $\frac{1}{4}$ W., or when cape Frehel lighthouse is a little open to the southward of the highest summit of the Comtesses rocks, the vessel may either haul to the eastward with the latter mark on, or steer for port Binic, avoiding the Ours-Seul by not coming nearer the shore than to have the Four rock in one with Comtesse isle.

If passing eastward of St. Quay rocks, which it will always be prudent to do at the neaps, it is found after rounding their south-east extreme that the vessel cannot fetch port Binic, shelter should be sought under Roselier point, on the northern shore of port Aurelle (page 420), the grounding places in which, muddy sand, are only 3 feet above the lowest tides, and accessible to vessels of 14 feet draught at the springs, from 2 hours before to 2 hours after high water.

Tides.—It is high water, full and change, in port Binic at 6 h. 3 m.; springs rise 30 feet; neaps $22\frac{1}{2}$ feet. The former rise about 15 to 21 feet above the berths at the foot of the eastern jetty, the latter about 6 feet.

The Longue rock (at the south part of the St. Quay group) uncovers 26 feet at low-water great springs, and never covers at the neaps. When it is awash at the springs there are $14\frac{3}{4}$ feet at the foot of the pier-head of the outer port of Binic; 11 feet at the entrance of port Legué; $12\frac{1}{2}$ feet at the entrance of port Dahouet; and nearly 23 feet on the grounding places close to the southward of Roselier point. When the highest head of the Trahillions ledge or the grand Léjon rock cover (they both uncover 23 feet at great springs), there are $11\frac{1}{2}$ springs at the foot of the pier-head of the outer port of Binic; $7\frac{3}{4}$ feet at the entrance of Legué, and $9\frac{1}{2}$ feet at the entrance of Dahouet.

Anchorage.—Vessels waiting tide to enter port Legué or port Binic can anchor in fine weather abreast Binic on a bottom of clayey mud, with the Pommier and Hergue rocks in line, bearing N. by W. $\frac{3}{4}$ W.

Care must, however, be taken not to anchor with the Roselière rock bearing to the eastward of E. $\frac{3}{4}$ N., (when it will be in line with the Longue), nor with Binic to the northward of W.N.W.

PORT de PORTRIEUX, in the northern part of Portrieux bay half a mile to the southward of St. Quay point, is used by vessels capable of taking the ground, but its access is difficult without the assistance of a pilot. The entrance is comprised between the coast and a jetty that extends from the north point of the bay, and which is now being considerably lengthened (1874), and will reach when finished to the middle of the bay.

A Life Boat is stationed at this port.

LIGHT.—On the new pier-head at Portrieux stands a white light-house, from which at an elevation of 34 feet above the sea, is exhibited a *fixed red* light, visible in clear weather seven miles.

RADE de PORTRIEUX, between the St. Quay rocks and the coast, has good holding ground and sufficient depth for vessels of not more than 14 feet draught. It should not be used, however, with strong easterly winds, except at the lowest neaps, and then only when there is an impossibility of reaching a place of shelter on the eastern shore of the bay, either in Erqui road or under Pleneuf point.

Anchorage.—The anchorage in this road is comprised between the following limits:—The Hergue and Pommier rocks in one; the Hergue in line with the foot of the steep declivity of Plouha point; Caruhel mill in line with the summit of Four rock, and Portrieux church in line with the centre of the jetty of port Portrieux. The depths are from 14 to 18 feet at the lowest tides, between the southern limit of the anchorage and the line on which St. Michel mill is in one with the end of the jetty. In this latter direction from west to east, there are from 10 to 20 feet, and from 11 to 12 feet between this direction and the northern limit of the anchorage. The best berth with the most water is, with Étables steeple in one with the Four rock, and St. Michel mill and the end of the jetty in line.

Tides.—It is high water, full and change, at Portrieux at 6 h. 0 m.; springs rise 31 feet; neaps 23 $\frac{1}{2}$ feet. The tidal streams in Portrieux road follow nearly the direction of the Hergue and Pommier rocks in line. At the springs the greatest strength of the flood between Harbour isle and St. Quay point, as well as among the rocks to the northward of the road is 4 $\frac{1}{2}$ knots; the strength of the ebb is rather less.

The COAST from St. Quay point trends 7 miles in a N. by W. direction to Minar point, and is high, steep, and inaccessible, except for boats with off-shore winds, on the beach fronting the village of St. Quay,

about 3 cables to the westward of St. Quay point, and on the beach of Brechech bay about $1\frac{3}{4}$ miles to the southward of Minar point. This point may be recognised from a great distance by a white pyramid, a guard-house, and an old semaphore on its summit; it is bordered by numerous rocks which bar its approach to within 3 cables at low water. Plouzec point, $1\frac{1}{2}$ miles to the northward, is nearly as high as Minar point, and near it are three remarkable islets, the highest of which is named Mets de Goelo.

Bec de Vir point is $1\frac{1}{2}$ miles from St. Quay point and abreast it, and a good half mile from the shore, is the north extreme of St. Marc bank, which thence trends about a mile to the southward, parallel to the shore, and carries a depth of about 3 fathoms at low water. Plouha point, $1\frac{1}{4}$ miles N.N.W. $\frac{1}{2}$ W. of Bec de Vir, is the highest point in St. Brieuc bay; it terminates in a perpendicular rocky cliff, visible in clear weather 25 miles.

The land between Minar point and the remarkable hill named Creach-ar-Maout is high and visible in clear weather from a distance of 22 miles; its highest parts are, the hill on which the village of Plouzec is built; La Trinité point, 3 miles to the north-west of Plouzec point; and Arcouest point a mile to the northward of La Trinité. Arcouest point, with a guard-house on its summit, is as high and steep as Minar point, and, when coming from the westward, it is the first high point on the west coast of St. Brieuc bay that will open out to the eastward of Creach-ar-Maout hill.

The Place de Grève, the Traverse, and the Oiseaux, are shoal patches lying nearly on the parallel, and from $1\frac{1}{4}$ to $2\frac{1}{4}$ miles from Plouha point. The former, the shoalest and nearest the shore, carries a depth of 3 fathoms, and from it the southern mill of Plouzec is in line with the centre of the Mauve rock; the other two patches have from 5 to 7 fathoms over them. The Mauve is a large rock lying 4 cables from the shore, and 3 cables to the north-east of the Pommier; it never covers, and forms with other rocks which surround it a ledge 4 cables long, east and west.

Anchorage.—The shore between Plouha and Minar points is clear of danger, and with off-shore winds can be approached within half a mile at low water. The Taureau rock, which uncovers 33 feet at the lowest tides, lies in the bight of the coast between the Mauve rock and Minar point, and is marked by a stone tower erected on it. By keeping the pyramid on the Cormorandière rock open about half a point east of Minar point, it will lead to the eastward.

With the wind between E.N.E. and South a vessel should avoid approaching too near this part of the coast, as the streams set into the bight. If obliged by a calm to anchor, endeavour to do so when the

steeple of Treveneuc church is in line with the Comtesses de Gueredan, a large rock lying at the foot of Plouha point, bearing S. $\frac{1}{4}$ W.

Tides.—At half flood an eddy runs to the N.N.W. in the same direction as the following ebb from St. Quay to Plouzec point, also in Paimpol bay, as far as Arcouest point; its strength will be found greater in the bights than off the straight parts of the coast.

ANSE de PAIMPOL.—This deep bay, formed between the high points of Plouzec and La Trinité, is entirely dry at the lowest tides. Guilben point divides the bay into two parts, and it is to the northward of this long point that port Paimpol and the principal beaching places are situated. The port is inaccessible at neaps, and has but from 13 to 19 feet water in it at high-water springs; the entrance is between a pier-head and the north extreme of some quays.

There is anchorage to the south-west and south-east of St. Riom isle, in the narrow channel separating the mud-banks which dry at the south end of this isle from those in Paimpol bay. There is a beacon on the Plateaux des Fillettes, south of St. Riom. A vessel will have a good berth by mooring north and south, to the south-west of the isle in 5 fathoms at low water, muddy bottom, with the guard-house on Arcouest point in line with the northern extreme of La Trinité point, and the pyramid on the Cormorandière rock between the Dénou rock and the north-west rock of the Roho ledge. There is not much sea here, even during strong easterly winds, except at high water.

The holding ground at the anchorage to the south-east of St. Riom isle is good but exposed to easterly winds. It lies in the direction of the beacon on the Ar-Zel rock in one with the summit of Blanche de Guilben isle, W. $\frac{3}{4}$ S.; its north-east limit is the Héaux lighthouse just opening out behind Arcouest point; and its south-west limit is the guard-house on Minar point a little open to the eastward of Plouzec point.

Beaching Places.—Port Lazo, situated in the south-east part of Paimpol bay under the high land of Plouzec point, is a good position to beach a vessel of moderate draught that can take the ground. The berths do not dry more than $9\frac{1}{2}$ feet below the lowest tides, and are well sheltered from East to South.

The other grounding places in this bay are in front of port Paimpol, to the northward of Guilben point, and the most frequented are situated on the flat between the channel and the rocks which border the shore from the port to the point. The bottom is of mud and sand, and dries about $16\frac{1}{4}$ feet above the lowest tides. The sea is rough here at high water when it blows hard from the eastward, but the bottom is soft, and the sea falls before the vessel takes the ground.

There is also a good beaching place between the extreme of Guilben point and Blanch de Guilben isle. The best berth is about $1\frac{1}{2}$ cables to the northward of the isle, where the bottom is soft mud, and elevated about 10 feet above the lowest tides. Another good position, where vessels lie up during the winter, is in the northern part of the bay, in front of the hollow formed by the shore under a high part of the coast called Lande de Portz-don. A vessel drawing $10\frac{1}{2}$ feet will here be only neaped one day.

LIGHT.—From the gable end of the keeper's dwelling on Portz-don point, north side of entrance to Paimpol harbour, a *flashing* light is exhibited at an elevation of 35 feet above high water (17 feet above the ground), showing *red* through an arc of $7\frac{1}{2}^{\circ}$, or between the bearings of N. $61\frac{1}{2}^{\circ}$ W. and N. 69° W.; and *white* through an arc of $3\frac{1}{2}^{\circ}$, or between the bearings of N. 69° W. and N. $72\frac{1}{2}^{\circ}$ W.; in all other directions it is obscured.

The white light should be visible in clear weather from a distance of 11 miles; the red light, from a distance of 7 miles.

PASSAGES LEADING to ANSE de PAIMPOL.—

There are five channels leading to the above anchorages to the southward of St. Riom isle, but they lie in the midst of the dangers fronting Paimpol bay, and only two of them, the Jument and the Dénou, are practicable without a pilot after half flood; the others are called the St. Riom, the Lastel, and the Trinité.

Passage de la Jument.—The entrance to this channel is about $1\frac{1}{2}$ miles to the northward of Plouzec point, between two remarkable large rocks lying one mile apart in a N. by E. $\frac{1}{2}$ E. and S. by W. $\frac{1}{2}$ W. direction, the one named the Ost-Pic, lying at the eastern extreme of Mets de Goele islet, and the other at the south-east extreme of the Roho ledge. The channel is shallow at low-water springs, but at half-flood there are 22 feet on the bank extending from the south part of the Roho ledge to the Jument rock.

The Jument, Gueule, and Gouayan rocks divide this channel into two parts, both of which are practicable for vessels of moderate draught. The former rock uncovers $7\frac{1}{2}$ feet, the Gueule 3 feet, and the Gouayan 16 feet at the lowest tides. The Jument and the Gouayan have beacons on them, the former being painted red and black horizontally; the Gueule lies midway between the beacons, about half a mile to the E.S.E. of the Jument.

Passage du Denou is close to the eastward of St. Riom isle, between Garap and Rohan-hier ledges, to the eastward of a large rock named the Valve, and westward of Guillaume and Dénou rocks; the latter rock lies about a quarter of a mile E.S.E. of the eastern point of St. Riom.

This channel has the advantage of lying in the direction of the flood stream, but it is narrow, and with the space which separates it from Bréhat isle can only be navigated by local pilots with a fair wind. After half-flood, if the leading mark is made out, a vessel can run through without risk.

Passage de St. Riom is the narrowest of all the channels leading to Paimpol bay, and is but seldom used. It lies close to the north-west side of St. Riom isle, between that isle and the Vras rock.

Passage de Lastel, is a narrow channel formed to the southward of the Men-Gam rock and of the rocky ledge extending from the south end of Blanche de l'Arcouest isle. It is through this channel that pilots generally take vessels bound seaward from Paimpol.

Passage de la Trinité, the entrance to which is southward of Bréhat road between the Piliers rocks and those off the north end of Blanche de l'Arcouest isle, is generally taken by vessels bound to Paimpol under charge of local pilots, who have conducted them through either the Moisie, the Men du Castrec, or the Kerpont channels (page 432). It unites with the Lastel channel half a mile northward of La Trinité point.

Directions.—When bound from the south-east to the anchorages under St. Riom isle, or to any of the beaching places in Paimpol bay, a vessel will pass between the Ost-Pic and the Calemarguiers rocks, and between the coast and the off-lying shoals between Minar and Plouzec points, by keeping the summit of the large rock lying at the south-east part of the Roho ledge in one with the eastern point of Ar-Morbic isle, bearing N. $\frac{1}{4}$ E. This isle is on the eastern side of Bréhat, and on the above bearing appears part of it; its eastern point is high and well-defined, and is the extreme of land seen to the northward. Give the Ost-Pic a berth of about 2 cables in rounding it, and thence steer for the anchorages or grounding places, passing to the southward of the beacons on the Gouayan and Jument.

If bound to Paimpol bay from the northward, and intending to run through the Dénou channel, having passed through Bréhat channel (page 431) steer S.W. by S. with Rundavi mill in line with the summit of Dénou rock. After passing westward of this rock, the beacon on the Ar-zel rock kept in one with the summit of Blanche de Guilben isle, W. $\frac{3}{4}$ S., will lead to the anchorage to the south-east of St. Riom isle, or the vessel may be steered for one of the beaching places in the bay.

If the Jument channel be preferred, having run through Bréhat channel bring the Ost-Pic in line with the pyramid on the Cormorandière S.S.W., and the vessel will pass eastward of Cain ar-Monse, a rock awash at the lowest tides; when to the southward of this rock, or when the guard-house on Arcouest point bears W. $\frac{1}{2}$ N., steer to the south-east to bring Plouzec

mill in line with the eastern fall of Mets de Goelo islet, S.W. by S. Do not go westward of this line and it will lead a cable to the eastward of the Cormorandière bank. Plouzec mill in line with the Ost-Pic, S.W., will then lead to the eastward of the Charpentiers ledge, which is marked by a red beacon, and to the entrance of the channel.

At night.—Vessels approaching Paimpol anchorage at night, should carefully keep within the limits of Portz-don point *white* light, bearing in mind that the light is obscured northward of this sector, and that it shows red southward of it. Coming from the northward through Bréhat channel, vessels should enter the sector of *white* light shown from Paon point, and keep within its limits until Portz-don point *white* light is seen, towards which they may then steer, proceeding, Paon point light will change in colour, and become obscured at the entrance to Portz-don anchorage.

Tides.—It is high water, full and change, at Paimpol at 6 h. 0 m.; springs rise 31 feet, neaps 23½ feet. The flood stream which enters Paimpol bay, after rounding the south-west part of Bréhat isle, sets to the S.S.W. and S.S.E.; but about four hours flood its direction is S.S.W. and S.W., and an eddy begins to follow the windings of the shore from Mets de Goelo isle towards Arcouest point. The breadth of this eddy increases rapidly; at one hour before high water it extends to the anchorage to the south-east of St. Riom isle, and at this period, and even after half flood, a vessel running from Bréhat road to Paimpol with a light wind, had better pass to the eastward of St. Riom isle, and even of the Cormorandière rock, than through Trinité channel, which can only be done when the wind is sufficiently strong to stem the eddy.

The ebb stream follows the same direction as the eddy on the flood, and forms an eddy behind each projecting point of the coast; but in proportion as the banks uncover, the body of the stream trends more and more towards Bréhat, to the southward of which it divides into two parts, one part passing eastward of the isle, and the other, after crossing Bréhat road, runs through Kerpont channel, and between the islets and rocks to the westward of it.

The velocity of both streams increases in the narrow channels, but about the Cormorandière bank, as well as to the eastward of Mets de Goelo isle and of Minar point, it does not exceed 4 knots at the springs, and 2 knots at the neaps.

ÎLE BRÉHAT lies one mile northward of Arcouest point, and the most apparent objects on it are, St. Michel chapel, the northern mill, and the southern mill (named Vieux-Moulin,) which has no sails, its roof painted red, and a zone 9 feet wide whitewashed below the roof. The most remarkable irregularities of outline are Paon point, forming the north-east extreme of the isle; the small hill on which the above chapel stands;

and the hillocks crowning the eastern and western points of entrance to port Clos. The isle appears distinct from the coast when it is on a South, S.W., or North bearing, but unless very near it, it will be blended with the land when it bears W.S.W. and N.W. The white pyramids placed on the Ar-Morbic, Louet, and Quistillic rocks, which front the eastern part of the isle, are also conspicuous objects and may be seen at some distance off.

The dangers surrounding this isle are comprised between the line on which the Héaux lighthouse bears West and that on which the mill, situated on the high land a little to the northward of Pomelin bay, is in line with the south-west point of Bréhat, N.W. by W. The streams, especially at the springs, rush with great velocity through this chain of dangers, and produce a violent race, which can only be crossed without risk at low water in the narrow cut called Bréhat channel. This channel, which is 2 miles long in a S. $\frac{3}{4}$ W. and N. $\frac{3}{4}$ E. direction passes about a mile to the eastward of Paon point, between the rocky ledges fronting the eastern side of the isle and the Echaudés ledge.

A Life Boat is stationed at Bréhat isle.

Pilots.—The Bréhat and Pontrieux river pilots keep out at sea when the weather permits. In fine weather fishing boats are often found in the locality of the Héaux lighthouse, and the masters of them, who are generally good pilots, will be found very useful until the coast pilots are met with.

Rade de Bréhat, on the south side of Bréhat isle, is the only place between the Héaux lighthouse and cape Frehel in which vessels of moderate draught can find shelter during strong winds from N.N.E. to N.N.W. The good holding ground trends east and west, in the direction of the guard-house on Bois isle (a high steep islet lying off the west point of entrance to Pontrieux river) in line with the southern face of a high rock named Men-ar-Vran, W. by N. $\frac{1}{2}$ N. ; its eastern limit is the eastern face of Mets de Goelo islet in line with the Men-Gam rock, S. $\frac{1}{4}$ E. and its western limit, St. Barbe mill in line with La Trinité point, S.S.W.

The best anchorage is with the above guard-house in one with the south face of the Men-ar-Vran, and St. Barbe mill, or the trees of St. Barbe chapel (this chapel is on the high land at the head of Paimpol bay, $1\frac{1}{2}$ cables to the westward of the mill) in line with the summit of Blanche de Arcouest isle S.S.W. $\frac{1}{2}$ W. The least depth in the road is 3 fathoms at low water. A vessel should moor E.S.E. and W.N.W.

Port la Chambre.—If surprised in Bréhat road with strong easterly winds, a vessel that can take the ground will find good shelter in port Chambre, which is formed between the south-east part of Bréhat isle and the Logodec and Lavrec rocks. It dries out at low tide, and its principal

entrance about half a cable wide, is between the rocks at the south-east point of the isle, and those adjacent to the western side of Logodec.

A vessel cannot proceed farther into this port than the large islet lying abreast the north end of Logodec, which divides the channel into two branches. The best berth is about three-quarters of a cable to the southward of the islet, where the bottom dries about 9 feet above the lowest tides. A clump of trees surrounding St. Barbe chapel, bearing S.S.W. $\frac{1}{2}$ W., and touching the eastern side of a large rock named Château-de-l'Île-Blanche, will lead to the entrance.

Port Clos, situated on the southern side of Bréhat isle between the southern entrances of Kerpont passage and Bréhat road, although difficult of access can, under most circumstances, afford refuge to vessels capable of taking the ground.

Three rocks, lying in a straight line, N.E. and S.W., divide the entrance of this port into two parts. The most southern, named Men Allan, lies near low-water mark, and uncovers about 19 feet; the second is about half a cable further in, and also uncovers 19 feet; and the third is about a cable to the northward of the second, and uncovers 26 feet. This latter rock has been joined to the western shore of the port by a causeway, which serves as a landing place, and which, when uncovered, shelters the inner part of the port. The bottom at the foot of the causeway dries $1\frac{1}{2}$ feet above the lowest tides; the best berth is half a cable N.N.E. of the rock at the end of the causeway, where the bottom dries nearly 11 feet above the same level. The greater number of vessels that enter the port do not go within the causeway, but lie about half a cable S.S.E. of the rock; the grounding places here are good, but the anchors have but little hold, and at high water they are exposed to winds between W.S.W. and S.S.E.

Port de la Corderie, on the north-west side of Bréhat isle, is another grounding place where vessels of moderate draught will find shelter when in charge of local pilots. Its entrance, which is only half a cable wide and open to the westward, is close to the southward of a small rocky ledge lying three-quarters of a cable to the south-east of a large rock, named Kervarec.

Vessels lie aground from the entrance to the head of the port. The best berth for those of about 15 feet draught is 2 cables inside the entrance; the sea is rough here only when it blows hard at high-water springs. Small coasters lie to the eastward of this position, and sometimes in the middle of the little cove at the head of the port, where the tide rises from 5 to 6 feet less than in the channel.

DIRECTIONS for approaching RADE de BRÉHAT from the WESTWARD.—If obliged to seek shelter in this road from strong winds between N.N.W. and N.N.E., when pilots cannot come

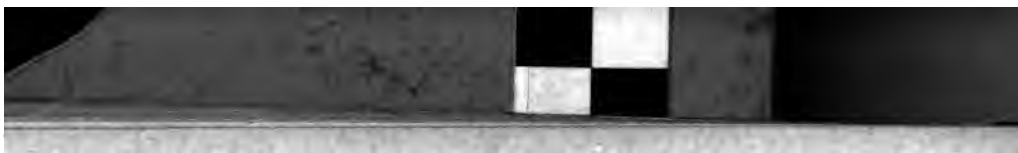
out in the offing, wait if possible to the N.N.E. of the Héaux lighthouse till half flood, when the tide will have risen in the vicinity of Bréhat isle, and also in St. Brieuc bay, $18\frac{1}{2}$ feet at great springs above what it is marked on the charts. At this period a vessel can run through Bréhat channel into Bréhat road without risk, for the channel which is only 2 cables wide at low water, will then be half a mile broad.

Through Chenal de Bréhat.—Having rounded the Roc'h-ar-Bel ledge (page 407), the leading mark between Bréhat channel from half flood to half ebb is, the pyramid on the Cormorandière rock in line with the pyramid on Minar point bearing S. by W. $\frac{1}{4}$ W.; but if before half flood the former pyramid must be kept between the second and third group of houses seen on the high land between Plouha and Minar points; this latter mark will lead to the westward of three shoal patches on the Echaudés ledge, the most southerly of which, named Roc'h-Couban, has only 8 feet over it at the lowest tides. By following either of these leading marks, according to the time of tide, a vessel will pass to the westward of the Pain-de-Bray rock, which uncovers 2 feet, the Echaudés rocks, the highest head of which uncovers $8\frac{1}{2}$ feet, and a little ledge named Lello-Bras, the highest head of which is awash at the lowest springs. The sea is always high in the eddies of these rocks when it blows hard.

When the red tower on the Men-Garo rock comes in line with the pyramid on the Quistillic rock haul more to the westward and bring the beacon on Pilliers rock in line with Lannevez mill, W. $\frac{1}{4}$ S. This latter mark will lead into Bréhat road, passing three-quarters of a cable to the south-east of a small patch, named Basse de Men-Garo, on which there are about 26 feet, and a long cable to the north-west of another patch, called Caïn-ar-Rat, on which there are 23 feet at half tide.

The flood and ebb streams follow very nearly in the direction of Bréhat channel, and their velocity during springs varies from 3 to 5 knots, almost the whole time of their duration; but north of the channel, from its entrance to abreast Roc'h-ar-Bel, the direction of the flood is more to the eastward and the ebb more to the westward. Abreast the Roc'h-ar-Bel the flood sets to the S.E. from 4 to 5 knots, and the ebb N.W. by N. about the same rate, and that during a period of 4 hours. It follows therefore that a sailing vessel rounding Roc'h-ar-Bel from the westward, with the wind from that direction, would not be able to fetch the entrance of the channel, but would run the risk of being carried on to the Horaine ledge; and that leaving the channel with easterly winds during the ebb, she would not be able to weather Roc'h-ar-Bel.

Under these circumstances she should, in the former case, pass inshore of Roc'h-ar-Bel through the Moisie or the Men-du-Castrec channels; and



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on leaving Bréhat channel, she should, when abreast the beacon on the Petit-Pen-Azen, steer westward with Moisie rock (a large isolated mass $3\frac{1}{2}$ cables S.E. by E. of Sark rock, and which only covers at the highest spring) in line with the Héaux lighthouse; this mark will lead between the Sirlots ledge and the Men-du-Castrec ledge, into the Men-du-Castrec channel.

Through Passage du Men-du-Castrec.—The entrance to this channel is about $2\frac{1}{2}$ miles S.E. by E. of the Héaux lighthouse, between the Men-du-Castrec ledge and a small ledge named the Ar-Mesclek. The channel leads into the entrance of the Pontrieux river close to the eastward of the beacon on the Vieille, the most north-easterly of the rocks which extend in that direction from St. Modé isle (this isle may be seen from a distance of 7 or 8 miles; it has a large white watch tower on it and is steep on all sides). The tidal streams follow its direction, and their rate during springs is from $4\frac{1}{2}$ to 5 knots. The leading mark through is the guard-house on Arconest point kept on a S. by W. $\frac{1}{2}$ W. bearing, when it will be seen in the middle of the space which separates the high rocks bordering both sides of Kerpont channel.

The Men-du-Castrec channel at low-water springs can only be navigated with the aid of a pilot, as the leading mark passes close to an 8-foot patch lying at the north-east extreme of Ar-Mesclek ledge; but from half flood to half ebb vessels of 14 feet draught can run through it without any risk. With the wind between N.N.W. and W.S.W., and even at low water, pilots take vessels through it that are bound to the ports in St. Briec bay, but they quit its direction when the Moisie rock is in line with the Héaux lighthouse; they then steer with this latter mark on until they pick up the mark for Bréhat channel.

Through Passage de la Moisie.—This channel is very narrow but straight, and vessels of $14\frac{1}{2}$ feet draught can navigate it from half flood to half ebb. It lies between Sark rocks and the Men-du-Castrec channel, and like the latter channel it leads to the entrance of Pontrieux river, and of Kerpont and Bréhat channels. The leading mark through is, the old mill, without sails and with a red roof, of Bréhat isle, kept exactly between the western gable of St. Michel chapel and a stone cross near the chapel; but these objects are too close together for a good mark, and the services of a pilot are indispensable.

The flood stream runs $4\frac{1}{2}$ or 5 knots in this channel at the springs and nearly follows its direction as far as the beacon* on a flat rock, named the Noguejou-bian, which uncovers $12\frac{1}{2}$ feet; but beyond this the stream inclines to the S.W. towards St. Modé isle. The strength of the ebb is

* This beacon had disappeared in 1878.

rather less than the flood, and it takes more the direction of the channel as the tide falls.

Through Le Kerpont.—This channel which separates Bréhat from Béniguet isle, also leads into Bréhat road, but is only practicable for vessels of moderate draught after 4 hours flood, at the period the rate of that stream begins to slacken. The leading mark through is the same as that for the Men-du-Castrec channel, viz., the guard house on Arcouest point bearing S. by W. $\frac{1}{2}$ W., when it will be seen in the middle of the space which separates the high rocks bordering each side of the channel. Both these channels are practicable for vessels drawing $14\frac{1}{2}$ feet as long as the Vielle rock is covered, the least depth in the Kerpont at that time being $16\frac{1}{2}$ feet. This rock, which has a beacon on it, lies N. by E. $\frac{1}{2}$ E. about half a mile from the entrance, and uncovers 24 feet at the lowest tides.

The Kerpont has two outlets to the southward; one between the south-west point of Bréhat and the Noires ledge (the south-east rock of which, the Vif Argent, has a beacon on it and uncovers 17 feet), and the other between this ledge and the large rocks off the eastern side of Raguenzbras isle.

APPROACHING RADE de BRÉHAT from EAST and S.E.—Bréhat road can also be entered by passing between the dangers lying to the eastward of Bréhat. These channels are not much frequented, as the streams cross them obliquely, but under certain circumstances vessels of large draught can run through them even at low water.

The first channel eastward of Bréhat channel is bounded to the north-west by Horaine and Echaudés ledges, and to the south-east by Men-Marc'h ledge. The leading mark through is, the summit of a high rocky islet, named Ménou, lying half a mile eastward of La Trinté point, in line with the north-east mill of Lande-Blanche bearing S.W. by W. Follow this direction until Arcouest mill is in one with a great forked rock lying close to the north-west of Blanche de l'Arcouest isle, W. $\frac{1}{3}$ S.; this latter mark will lead up to La Rade beacon, whence a direct course can be steered for the road.

To pass through the channel between the Men Marc'h and the Ringuebras ledges, keep the highest summit of St. Riom isle in one with the north-east mill of Lande-Blanche, W.S.W., until Arcouest mill is in line with the above great forked rock, W. $\frac{1}{3}$ S., which will lead up to La Rade beacon. With a moderate wind, the Ringuebras can be crossed at the neaps from half flood to half ebb, by keeping the north-east mill of Lande-Blanche in line with the highest summit of St. Riom isle. The Sable banks can also be crossed under the same circumstances of wind and



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tide, by keeping Arcouest mill in line with the great forked rock, W. $\frac{1}{3}$ S.

If wishing to pass to the southward of the Sable banks, which it will not be prudent to cross at low-water springs, bring the pyramid on the Quistillick rock between the old mill and St. Michel chapel, on Bréhat, N.W., and it will lead close to the southward of their south extreme; a short distance southward of the Basse Pomorion, on which there are only 9 feet; and between the Caïn-ar-Monse rock, which is awash, and a small patch named the Carec-Mingui, on which there are only 8 feet at low water, When Arcouest mill comes in line with the great forked rock, W. $\frac{1}{3}$ S., steer for La Rade beacon.

To approach Bréhat road from the south-east, bring the northern mill on Bréhat in line with the pyramid on the Quistillic N. by W. $\frac{1}{2}$ W., and it will lead close to the westward of the highest heads of the Basse St. Brieuc, (marked by a buoy) which are awash at the lowest tides; over the north-east extreme of the Calemarguiers ledge; a short distance to the westward of the highest part of a sand-bank lying between this latter ledge and the Charpentiers ledge; close to the north-east of the Charpentiers rocks and the pyramid on the Cormorandière rock. Continue in this direction until Arcouest mill is in line with the forked rock, W. $\frac{1}{3}$ S., when proceed as before.

Tides.—It is high water, full and change, around Bréhat isle at 5h. 51m.; equinoctial springs rise about 39 feet, ordinary springs 31 feet, and ordinary neaps 23 $\frac{1}{2}$ feet. In Bréhat road, the direction of the flood stream at its commencement, or at 5 hours before high water, is S.W. by W. The greatest rate of this stream, 2 knots, is at 2 $\frac{1}{2}$ hours before high water, when its direction is E.S.E.

The ebb begins to run to the N.W. a few minutes after high water. Its greatest rate, 1 $\frac{1}{2}$ knots, lasts from 3 to 4 hours after high water, when its direction varies from W.N.W. to W. by N. Winds from E.S.E. to S.S.E. cause a nasty sea in the road during the flood; the holding ground, however, is good.

The streams are not strong in Ferlas channel, which is a continuation of this road to the westward. The flood follows its direction as long as the banks are uncovered; it then sets towards Arcouest point. At about 20 minutes before high water an eddy comes from Paimpol bay, and, after rounding Arcouest point, sets from it with some strength towards the south-east point of Bréhat, and also crosses the eastern part of Ferlas channel towards Kerpont channel. Its rate decreases about the time of high water, but it resumes its strength as soon as the ebb stream begins. The latter stream takes the direction of this eddy until the banks are uncovered, when it runs to the westward in the direction of the channel.

RIVIÈRE de PONTRIEUX.—The northern entrance to this river is between the north-east part of the Roc'h-ar-Bel ledge and the northern part of the Horaine ledge. The river may also be approached from the eastward through Ferlas channel, which is comprised between the southern shore of Bréhat and the main-land, and is practicable for vessels of large draught when in charge of local pilots from half flood to half-ebb, but only coasters can use it at low-water springs.

Various anchorages in the entrance of this river afford refuge to vessels of draught, but they are difficult of access on the ebb, when they should not be attempted without a pilot. As the holding ground is bad and the streams rapid in the middle of the river, a berth should be taken as near as possible to the edge of the mud-banks on either side.

Pomelian road lies on the left bank of the river about 6 miles within the entrance, and the marks for the best anchorage in it are the guard-house on Arcouest point in line with the beacon on the Moguedhier rock, and the old mill on Bréhat just open to the northward of the enclosure on Verte isle; a vessel should moor here north and south. There is also anchorage to the north-east of this road, near the outer edge of the mud-banks which uncover as far as the line on which the pyramid on the Croix rock is in one with Loguivi mill; moor here W.N.W. and E.S.E.

Another good and well sheltered anchorage, in which the streams have not much strength, is near the edge of the mud-banks to the south-east of Bois isle. The anchoring ground extends in a N.E. and S.W. direction from the line on which the beacon on Vieille de Loguivi rock is in line with Arcouest mill, to that on which the northern mill of Bréhat is in line with the beacon on the Trou-blanc rock; moor here also W.N.W. and E.S.E.

The first anchorage within the river for a vessel of large draught is on the right bank, to the north and N.W. of a large rock named Mélus, which lies fronting the Douane or custom-house office on the Roc'h-ar-On. There is room for two moderate sized vessels between Bodic tower and Sabot-du-Sud rock; also excellent holding ground on both sides the river out of the strength of the streams southward of Coat-Mer cove, and to the south-west of a water-mill abreast the cove. The above tower is a large white pyramid erected half-way up the left bank of the river about one mile to the south-east of Bois isle, and is one of the leading marks for the entrance.

The port of Lézardrieux, situated on the left bank of the river, nearly $2\frac{1}{2}$ miles above the custom-house office on the Roc'h-ar-On, is full of rocks and dries out at all tides. Vessels of the smallest draught are neaped in it for 4 or 5 days; but at its entrance, among the rocks, there



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is a bottom of soft mud, on which two or three coasters can lie without being neaped.

Vessels can generally remain afloat in a small channel between this port and a rocky ledge in the middle of the river. Those bound up to Pontrieux also anchor here when they arrive at the neaps, or when at the springs they have to cross the difficult passages in the river, which cannot be done without the aid of a local pilot. The first of these passages, named Ar-Toul-Tane, is at a sudden turn the river takes 4 cables to the southward of Lézardrieux suspension bridge, which is elevated 108 feet above the lowest tides. The second passage is in the turn of the river under the high land and the château de la Roche-Jugut.

The little port of Pontrieux is on the right bank of the river, about half a mile below the town and 8 miles above Lézardrieux bridge. The berths at the foot of the quay dry about $22\frac{1}{2}$ feet above the level of the lowest tides.

LIGHTS.—On Paon point, at the north-east extremity of Bréhat isle, is exhibited at an elevation of 67 feet above high water, a *fixed red* light, showing a *cluster of white rays* through an arc of 8° , or between the bearings of N. $25^\circ \frac{1}{4}$ W., and N. $33^\circ \frac{1}{4}$ W., and in clear weather should be visible from a distance of 12 miles; the red light should be visible from a distance of 8 miles, and on Rosedo hillock of the same island, at a distance of 1,768 yards W. by S. of the above light, is another *fixed red* light 90 feet high, and visible 9 miles.

On La Croix rock, on the eastern side of the channel, at an elevation of 45 feet, is exhibited a *fixed white* light, varied by a *bright flash every four seconds*, and visible 10 miles. This light is visible 12° from centre of channel each way.

On Bodic heights, at an elevation of 176 feet, is exhibited a *fixed* light varied by a *bright flash every four seconds*, and visible 12 miles. This light is visible 9° from centre of channel each way, and should be brought in line with the above flashing light when entering.

Within Bodic lights, on the same side of the river, are two *fixed red* lights, viz.: the outer and lower, from keeper's house on the extremity of the peninsula of Coat-Mer, 39 feet high, and visible from a distance of 6 miles; whilst the inner and upper light, which lies 722 yards S.W. by W. $\frac{1}{4}$ W. from the lower, is 150 feet high, and visible 8 miles. This latter light is shown from a square white building, and is visible through an arc of 12° on each side of the channel.

A life boat is stationed at Paon point.

Directions.—The leading mark for the entrance of Pontrieux river is, Bodic lighthouse in line with Croix lighthouse, S.W. by W. $\frac{3}{4}$ W.

This mark will lead eastward of Roc'h-ar-Bel, Mer-du-Castrec, and Sirlots ledges, the latter having a red bell buoy moored on its eastern extreme, and westward of Horaine and Echaudés; on entering the river it will also lead eastward of the beacons on Vieille de St. Modé, Rodello, Kerrannets, and Moguedhier rocks, and westward of the beacons on Petit-Pen-Azen Corderie, and Frères rocks. The beacon on Petit-Pen-Azen bears about N.E. $\frac{1}{2}$ N., $4\frac{1}{2}$ cables from the north extreme of Bréhat, and a quarter of a mile to the north-west of it is a dangerous patch awash at low-water springs. The Corderie beacon is on the summit of a dangerous rock which uncovers about 13 feet, and lies only three-quarters of a cable eastward of the fairway. The beacon on the Moguedhier is about $1\frac{1}{2}$ cables N. by W. of the Croix lighthouse.

Having arrived at a position 3 or 4 cables to the north-east of the Croix lighthouse, or before the vessel is abreast the beacon on the Moguedhier, haul a little to starboard, to pass a safe distance westward of the Croix lighthouse; after which bring the keeper's house on Coat-Mer peninsula in line with the square white tower of inner light, which will lead to the inner anchorage of Coat-Mer.

By night enter the river with La Croix and Bodic lights in line, and when the Bodic light is hidden by La Croix Tower to an eye 8 feet above the sea, open out Bodic light to the westward, and pass La Croix on that side. Afterwards proceed with the two inner fixed red lights in line to the anchorage of Coat-Mer.

Through Le Ferlas Channel.—To run from Bréhat road into Pontrieux river through this channel, weigh when the rock at the south-west point of Logodec isle has just covered (it uncovers 22 feet at the lowest tides). Steer westward to pass midway between the beacon on the Piliers, and that on the Vif-Argent rocks, and half a cable northward of the summits of Rouray, Conan, and Levret rocks, which latter border the south side of the channel, and never cover; if a signal is made for a pilot when in their vicinity, the vessel will be boarded by fishermen, who will pilot her into the river to the southward of the Tranquet rock.

There is a passage also to the eastward of the Tranquet and the beacon on the Trou-blanc, named Trou-blanc channel, and when the wind allows, it will be better to take this route than that to the southward of the Tronguet, which it is sometimes dangerous and even difficult to do at the springs. The leading mark through this, the new mill of Loguivi, kept astern, between the Conan rock and the steep declivity of the northern point of Gouvern cove, S. $\frac{3}{4}$ W.

Tidal Streams.—The tidal streams at the entrance of Pontrieux river have already been noticed in (page 409). Within the entrance, between St. Modé isle and the Croix lighthouse, they follow the direction

of the channel, but to the north-east of that isle they cross the channel with great strength, and it requires a fresh fair wind to keep the leading mark on.

LIGHT.—Les Héaux lighthouse is erected on the north-east part of a rocky ledge, named Héaux de Bréhat, bearing N.W. $\frac{3}{4}$ N. nearly 5 miles from the north extreme of Bréhat isle, and N.W. by W. $\frac{1}{2}$ W. $6\frac{1}{2}$ miles from the beacon on the Horaine rock.

The general character of the light which is exhibited at an elevation of 148 feet above high water, is *fixed* white, but two *red* sectors are shown, one to the north-east, the other to the south-east.

The north-east sector of light is *flashing red*, visible through an arc of 19° , or between the bearings of S. 68° W. and S. 87° W., showing over the whole extent of Barnouic ledge.

The south-east sector is *fixed red*, visible through an arc of 32° , or between the bearings of N. 38° W. and N. 70° W., showing over the positions of la Horaine, des Echaudés, de Men-March, and du Ringue-Bras ledges.

The intervening space of 23° between the red sectors, through which the *fixed* white light is visible, is free of danger, except that of Roch-ar-Bel shoal, the shoalest part of which has only 11 feet on it at very low water.

The light is dioptric and of the first order, and should be visible in clear weather from a distance of 18 miles.

Vessels in the offing, with the white sector of Héaux de Bréhat light in sight, will be clear of danger in the channel between Barnouic and la Horaine ledges.

Approaching from the eastward, having passed well to the northward of la Horaine ledge, and crossed the line of the leading lights of Bodic heights and la Croix rock (Trieux channel), in one, a north-west course may be steered, and the flashing red sector of light entered.

CHAPTER XI.

LES HEAUX LIGHTHOUSE TO L'ILE D'OUESSANT.

VARIATION IN 1882.

Ile de Bas -	-	-	-	19° 30' W.
Ile d'Ouessant	-	-	-	20° 0' W.

The **COAST** to the westward of the Héaux lighthouse is low, winding, broken, and bordered with dangers, which between the lighthouse and the Sept-Isles rise from soundings of about 18 fathoms at low water; they will, however, be avoided by not bringing the lighthouse to bear more easterly than S.S.E. when within 6 miles westward of it, or the lighthouse on the Sept-Isles to the northward of West.*

Les **SEPT-ILES**, or Seven isles, are high and barren, and in clear weather may be seen 21 miles off. They bear W. by N. $\frac{1}{2}$ N. 14 miles from the Héaux lighthouse.

LIGHT.—From a square lighthouse, 52 feet high, on the east end of the southernmost isle, named Ile-aux-Moines (Monks isle), is exhibited at an elevation of 184 feet, a *fixed* light, varied every *three minutes* by a *bright flash*. The flashes are preceded and followed by short eclipses which do not appear total within the distance of 6 miles. The light, dioptric and of the third order, should be visible in clear weather from a distance of 14 miles, except when bearing about W. by S., when it is obscured by Rougie isle and the east end of Bóno isle.

A **Life Boat** is stationed at the Ile-aux-Moines.

PLATEAU des TRIAGOZ.—This dangerous ledge is about $4\frac{1}{4}$ miles in extent W. by N. $\frac{1}{2}$ N. and E. by S. $\frac{1}{2}$ S., and about a mile broad; its eastern end, on which are high rocks always uncovered, lies W.N.W. nearly 5 miles from the Sept-Isles. There are numerous rocky patches on the body of the ledge, but near its western end there is one, named the Fouillie, with only 14 feet on it, from which the Triagoz lighthouse is distant 3 miles S.E. $\frac{1}{2}$ E.; Ile de Bas lighthouse 15 miles W. by S. $\frac{1}{4}$ S.; and the highest rock at the east end of the ledge, 3 miles S.E. by E. The summit of this latter rock, named the Fourchie, is 34

* See Admiralty Charts :—North coast of France, sheet VIII., Ile d'Ouessant to Les Sept-Isles, No. 2,644; scale, $m = 0.5$ inch, and Channe Islands and coast of France, No. 2,669 b.; scale, $m = 0.5$ inch.

feet above the highest tides. The channel between this ledge and the Sept-Iles is 4 miles wide, safe and clear of danger.

LIGHT.—A lighthouse 92 feet high stands on Guen Bras rock, Plateau des Triagoz, and from it at an elevation of 98 feet above high water, is exhibited a *fixed* light varied by a *flash* of alternate *red* and white every *half minute*, and visible in clear weather from a distance of 12 miles.

Caution.—A vessel running to the eastward with the flood stream at night, should as soon as the light on Bas isle is sighted, steer so to pass well to the northward of it, not bringing it to the westward of W. by S. $\frac{3}{4}$ S. until the light on the Sept-Iles bears S.E., in order to clear the Triagoz ledge; for this stream sets strong to the south-east, and does not turn in the offing until $3\frac{1}{4}$ hours after the time of high water on the shore.

RIVIÈRE de TREGUIER, the entrance to which is $3\frac{1}{2}$ miles to the westward of the Héaux lighthouse, affords excellent shelter, but is difficult of access to sailing vessels, and with gales from N.N.W. to E.N.E. a heavy sea runs at the entrance on the ebb. The three channels leading to the entrance are named Pas de la Gaine, Grande Passe, and Passe du N.E.

Passe de la Gaine, the most easterly of these channels, is practicable for vessels of about 14 feet draught after $3\frac{1}{2}$ hours flood, and will be found useful when bound into the river from the eastward, if there is sufficient wind to stem the tide. The entrance is comprised between the Héaux and Sark rocks, and the leading mark through is a large house, standing alone to the northward of Plougrescan, in line with the summit of Men-Noblanche, bearing W. $\frac{1}{2}$ S. By following this direction a vessel will pass nearly half a mile southward of Héaux lighthouse and over Pont de la Gaine, which is a narrow cut in the ledge extending from the south end of the Duono rocks with only a foot water in it at the lowest tides.

Grande Passe leads to the entrance of the river from the north-west, and is practicable for vessels of any draught. When entering by this channel, keep St. Antoine mill exactly in line with the mill of Port-de-la-Chaine, S.S.E., and the vessel will pass about 3 cables eastward of Rennauds rocks, which never cover; over a patch of 4 fathoms, which with the leading mark on, is the least depth in this channel at the lowest tides; about a cable to the eastward of Pierre à l'Anglais rock, which uncovers 8 feet; and 2 cables westward of the beacon on the Corbeau rock, which uncovers 19 feet.

By night the red and white lights in line S.S.E. lead through the Grande Passe.

Passe du N.E.—The large spire of Tréguier cathedral kept exactly in line with the tower on the Skeiviec rock, S.W. $\frac{1}{4}$ W. will, with an easterly wind on the flood, lead to the entrance of the river; but

as this line of direction crosses the Jument ledge, the western extreme of which lies N.W. $\frac{3}{4}$ W. nearly 2 miles from the Héaux lighthouse, it must be left (both on entering and leaving the river) to pass to the westward of the ledge. If not drawing more than 17 feet, the vessel having rounded the western extreme of the Jument, can, by steering with the above leading mark on, cross the Basses de Roch Hir when the Petit Roch Hir is covered. This rock lies on the north-east part of this ledge, and uncovers 13 feet at the lowest tides.

LIGHTS.—Three lights are established at the entrance of Treguier river. On point de la Chaîne a *fixed* white light is exhibited at an elevation of 36 feet above high water, from the keeper's house at Moulin, visible 6 miles; near St. Antoine mill, is a *fixed red* light 105 feet above high water, and visible 9 miles. The red light is distant three-quarters of a mile S.S.E. of the white light, and when in line lead through the Grande Passe.

From a lighthouse 63 feet high erected on La Corne rock, east side of the entrance of Treguier river, a *fixed* light elevated 38 feet above high water, is exhibited, showing sectors of green, red, and white, as follows:—*green* on a W.S. westerley bearing, embracing an angle of $7\frac{1}{2}^{\circ}$ or between the Small Pen-ar-Guezec and the shoal of port Beni: *red* eastward of the green sector; and *white* on an E.N. easterley bearing, embracing an angle of $7\frac{1}{2}^{\circ}$.

The green light should be visible 4 to 6 miles.

Anchorage.—There are three well-sheltered anchorages from wind and tide in Tréguier river, which, from abreast the Skeiviec rock, lying $1\frac{1}{2}$ miles within the entrance, to the town of Tréguier, is deep enough for coasters always to remain afloat. The best and most convenient of these is the Palamos anchorage, lying about 2 miles within the Skeiviec, in which the depths are from $2\frac{1}{2}$ to 4 fathoms at the lowest tides.

Directions.—In steering through either of the above channels for the entrance of Tréguier river, keep the leading mark on until the large spire of Tréguier cathedral is in line with the Skeiviec rock, S.W. $\frac{1}{4}$ W. This latter mark will lead into the river, but before running in a calculation must be made that the vessel's draught will admit of her passing over an 8 feet patch, lying a cable outside the ledge bordering the eastern side of Er isle, and also over the Pie bank on which there are only 6 feet at the lowest tides. After passing between the beacou on the Taureau and Corne rock (these rocks lie about $1\frac{1}{4}$ miles within the entrance and between them the deep-water channel is not more than three-quarters of a cable wide); and to the southward of the Taureau bank, steer up the river keeping midway between the rocks bordering its banks.

At night vessels entering Treguier river should steer with the light of Point de la Chaîne in line with the light at St. Antoine bearing S.S.E.,

until the green light of La Corne is seen, then steer for La Corne light, keeping within its green sector. Pass a short distance westward of La Corne rock and anchor within the white sector of light, which marks the inner anchorage.

Tides.—It is high water, full and change at the entrance of Tréguier river at 5 h. 22 m.; equinoctial springs rise about 35 feet, and neaps 21 feet. Off the town of Tréguier it is high water at 5 h. 32 m.; springs rise 25 feet, neaps 18½ feet.

The flood stream which sets into this river, rounds the northern shore of Er isle, until the bank connecting this isle to the main at low water is covered, which takes place about the period of half flood; it then slackens at the entrance of the river and runs to the eastward. The rate of the flood within the river is never more than 3 knots; that of the ebb is rather less.

PORT BLANC.—From the western point of the entrance to the river Tréguier the coast trends West 9 miles to Perros bay and is fronted by innumerable rocks both above and under water. About midway is a little inlet, named port Blanc, with Leverettes and St. Gildas isles on the east side of its entrance, and Château Neuf isle and the Four ledge on the west side. The port is well sheltered and affords safe refuge during westerly gales; with north-easterly winds the anchorage in it is considered preferable to that in Perros bay.

The leading mark into this port is Comtesse mill in line with the centre of a little white sandy beach, situated close to the eastward of the Voleur rock, at the head of the port, S. ¾ E. A vessel will not have less than 22 feet at low water by anchoring north-west of a large rock, named the Louet, lying on the eastern side of the port. If she can take the ground, good beaching places will be found to the east and E.S.E. of the Voleur, where the bottom is 10½ feet above the lowest tides.

ANSE de PERROS, situated 4 miles westward of port Blanc, affords good shelter from westerly winds to vessels that can take the ground. Those of light draught can lie afloat in the outer part of the bay, between which and the head of the bay, called the port, the beaching places are excellent, on a bottom of muddy sand elevated about 9½ feet above the lowest tides. Vessels sometimes run into the port for shelter, but they risk being neaped. Tomé, a narrow islet nearly a mile in length, lies a mile to the north-west of the western point of the bay, and its highest part is about a third of the length of the isle from its north extreme.

A Life Boat is stationed at the head of the bay.

LIGHTS.—At Nantouar, in Perros bay, two *fixed* white lights are established, the one near the shore being 33 feet high and visible 10 miles; whilst the inner light, which is at Kerjean 750 yards from the former, is 253 feet high, and visible 12 miles.

In addition to the above, two *fixed* white lights are established at the port of Perros bay, viz., a light near Pigeon-house, elevated 89 feet, and visible 12 miles; and an inner light, at Kerprigent, 3,133 yards from the above, elevated 259 feet, and visible 12 miles.

Directions.—A vessel bound into Perros bay from the eastward, will pass to the north-west of the outer edge of the Four ledge by not going to the southward of the line on which the high steeple of Nôtre Dame de Clarté church is in one with the highest part of Tomé isle, W. $\frac{1}{2}$ S. As this mark leads close to the southward of the rocks which extend more than half a mile E.S.E. from the north end of Tomé, when near them haul to the southward, and steer nearly parallel to the eastern side of the isle, until the beacon on Pierre du Chenal rock bears W. by S. $\frac{1}{2}$ S.; this rock lies S.W. $\frac{1}{2}$ S. about half a mile from the south extreme of Tomé and uncovers 14 feet at the lowest tides. Or, having passed the western point of the Four ledge, haul to the southward, taking care not to bring the beacon to the westward of this bearing to avoid the Morville rock, which uncovers 5 feet. When within half a mile of the beacon, keep it a little on the starboard bow to pass to the southward of the Pierre Jean Rouzic rock, which lies within this distance to the north-east of the beacon, and uncovers only a foot. After passing close to the southward of the beacon, if of light draught, the vessel can anchor about $1\frac{1}{2}$ cables to the south-west of it, where the depths are 11 to 14 feet at the lowest tides, or if capable of taking the ground she can proceed to one of the beaching places.

When approaching the bay from the north-west, steer for the south extreme of Tomé, passing to the westward of two pointed rocks named the Bilzic, which lie nearly a mile off its western side and uncover 22 and 32 feet. Directly the beacon on Pierre du Chenal is seen, steer for it on a S.S.E. bearing, and it will lead nearly a quarter of a mile eastward of the beacon on Bernard rock, lying nearly that distance off the west point of the bay. Four patches, the highest of which is awash at low water, lie between this latter rock and the Pierre du Chenal; therefore, at that time of tide, do not proceed farther to the southward than to have Perros church opening south of the hill on the western point of the bay.

By Night.—The Nantouar and Kerjean lights in line indicate the direction of the western passage into Perros bay; the Pigeon-house and Kerprigent lights in line, the direction of the eastern passage. Vessels

intending to enter the port of Perros by the western passage should leave the line of direction of the two former lights a little before Pigeon-house and Kerprigent lights come in sight; the two latter lights in line lead in.

PLOUMANACH LIGHT.—On Mean Ruz, off the point of the small port of Ploumanach, at an elevation of 69 feet above high water, is exhibited a *fixed red* light, visible in clear weather from a distance of 7 miles.

Tides.—It is high water, full and change, at Ploumanach at 5 h. 15 m.; spings rise $24\frac{1}{4}$ feet, neaps $18\frac{1}{4}$ feet.

The Coast.—At 6 miles W.S.W. of the Sept isles is Grande Ile surrounded with numerous other isles and rocks. Between this isle and Primel point, which bears W. $\frac{1}{2}$ S. $10\frac{1}{2}$ miles, the coast falls back to the south-east and forms a deep bay, the shores of which are fringed by numerous rocks, many of them being upwards of $1\frac{1}{4}$ miles from the land. There is a good anchorage on the eastern side of the bay, off the mouth of the river Lannion, for which see directions in (page 446). To the westward of Primel point is Morlaix bay, at the head of which are the entrances to the rivers Morlaix and St. Pol-de-Léon. Within the entrance of the former river is Morlaix road, where there is anchorage for vessels of the largest draught.

PLATEAU de la MÉLOINE is the name given to a group of rocky heads with deep water between them, which commences N. by E. $\frac{1}{4}$ E. $1\frac{1}{2}$ miles from Primel point, and extends for a distance of 5 miles in an E. by N. direction, forming a most dangerous obstacle to vessels entering Morlaix from the eastward. The western extreme of the ledge is called the Trépieds, the highest rock of which uncovers 9 feet, and the marks for it are, the steeple of Plougaznon church in line with Carrec-au-Ti rock S. $\frac{1}{4}$ E., and the two spires of St. Pol-de-Léon church in line with Bisayers rock, W. by S. A black buoy is moored on the western extreme of the Trépieds.

RIVIÈRE de MORLAIX.—The entrance to Morlaix river is on the eastern side of Morlaix bay, but its navigation is too intricate to be attempted without a pilot. There are two channels leading into it, the eastern of which is named Chenal de Tréguier, and the western Grand Chenal; the former, although not so deep as the latter, is generally preferred by coasters as its width will admit of tacking. The position of the little port of Penpoull, on the western shore of the bay, is easily known by the two lofty spires of St. Pol-de-Léon cathedral, situated about half a mile to the westward of it.*

* See Admiralty chart, channels and road of Morlaix, No. 2,744; scale, $m = 5$ inches.

LIGHTS.—To enter Morlaix river at night, two lights of the third and fourth order are exhibited, one from Noire islet, lying just within the entrance of the river, 4 cables to the south-east of the Château du Taureau isle, and the other from Lande tower on the left bank of the river, and when in line S.S.W. $\frac{3}{4}$ W. they lead to the entrance. That on Noire isle is a *fixed* white light, varied every *two minutes* by a bright *flash*, preceded and followed by a short eclipse; it is elevated 46 feet above high water level, and is visible from a distance of 10 miles. Lande tower exhibits, at an elevation of 285 feet above the same level, a *fixed* white light, visible in clear weather 13 miles.

Besides these two lights there is a small *fixed red* light shown from the southern side of Château du Taureau isle, to light the northern part of Morlaix road; and a *fixed* white light from Louet island, visible 10 miles.

Fog Signal.—In foggy weather a bell is sounded from Noire isle every quarter of an hour, for a space of two minutes.

Directions.—If intending to enter Morlaix river by the Tréguier channel, a calculation must be made that the tide has risen sufficiently for the vessel to pass over a patch nearly awash at the lowest tides, lying in the narrows of the channel with the leading mark on abreast the beacon on Blanche isle. Directly Lande Tower is made out, steer to the southward with it in line with the summit of Noire isle bearing S.S.W. $\frac{3}{4}$ W., and it will lead westward of the buoy on the Trépieds ledge; to the eastward of Pierre-Noire and Grand Areman rocks, both of which are marked by beacons; and westward of the beacons on the Petit-Aremen, and the Manou rocks up to the entrance of the river. When abreast the beacon on Blanche isle, steer W.S.W. until the western part of Ricard isle touches the eastern part of Château du Taureau isle, which is the line of direction of Morlaix road, and also of the channel into the river.

When steering for the entrance of the channel at night, endeavour to bring the *fixed* light on Lande tower in line with the *flashing* light on Noire isle, S.S.W. $\frac{3}{4}$ W., as soon as they are made out, in order to pass to the westward of the Trépieds. Follow this direction until the *red* light on the southern face of the Château du Taureau bears West, then steer towards it, keeping it on the starboard bow until it bears North, when the vessel will be in Morlaix road and can anchor as convenient.

Entering by Grand Chenal into Morlaix river, steer towards the eastern end of Bas isle until a double headed rock, named Tisaoson isle, lying E.S.E. three-quarters of a mile from the eastern extreme of the isle is made out; with this rock bearing W. by N. about 3 miles, and the small tower on the Duon rocks W. by S. $\frac{3}{4}$ S. $1\frac{1}{2}$ miles, the vessel will be at the entrance of the channel and nearly three-quarters of a mile N.E. $\frac{1}{2}$ E.

from 2 to 3 fathoms at low water. There is a long and narrow swatchway with 11 to 15 feet in it, between the northern edge of the shallow shifting sand-bank named La Traverse, which bounds the anchorage to the eastward, and the sand-bank which borders the south side of the isle; and although the streams in it run with great strength, yet coasters prefer anchoring there, as they are well sheltered, and, if necessary, they can be beached on the sands in Porz Kernoch, where the bottom dries only 6 or 7 feet above the lowest tides.

Directions.—When bound through the channel between Bas isle and the coast from the westward, St. Barbe chapel in line with the Loup rock S.E. $\frac{3}{4}$ E. easterly, will lead northward of the Lavandières rocks, which never cover, and in not less than 5 fathoms at low water, until nearly up to the *red* beacon on the Oignon rock, which uncovers 22 feet and must be left to the southward. When about a cable westward of this rock, or as soon as the chapel of Nôtre-dame-de-Bons-Secours, on the southern side of Bas isle, appears nearly midway between the most eastern mill and the next mill to the westward, steer E.S.E. for the anchorage.

The services of a pilot are indispensable when bound through this channel from the eastward. The small tower on Bas isle in one with a white painted mill will lead to the entrance and to the southward of Pighet isle, after passing which there is an anchorage of small extent over a bottom of gravel and broken shells where a vessel can wait for favourable moment either for running through the channel or for entering port Roscoff.

PORT de ROSCOFF.—This little tidal harbour is situated about a mile S.S.E. of the south-east extreme of Bas isle, and the grounding places in it dry from 12 to 19 feet above the lowest tides.

Approaching port Roscoff from the eastward, keep the south east extreme of Bas isle open northward of Tisaoson isle, until within half a mile of the latter isle, when steer for Bloscon point, on the summit of which stands St. Barbe chapel. Pass about half a cable northward of the fortified islet at the foot of this point, and run through the channel limited by this islet on the eastern side, and by two beacons on the western side; the outer beacon stands only 164 yards to the north-west of the islet. This channel is difficult to navigate even at high water, and impracticable on the ebb.

LIGHT.—A *fixed* white light, elevated 22 feet above high water (20 feet above the ground), is exhibited from an iron standard, on the extreme end of the mole, Roscoff harbour, and should be visible in clear weather from a distance of 7 miles.

Tides.—It is high water, full and change, in port Roscoff at 4 h. 49 m. The tide rises at the anchorage in the eastern part of the

channel between this port and Bas isle, 30 feet at great springs, 23 feet at ordinary springs, and 17 feet at ordinary neaps; neaps range about 11 feet.

The COAST between Bas isle and the isle of Ouessant, which is 43 miles to the westward, is moderately high, and in clear weather may be seen 15 or 18 miles off; but it is fronted with rocks, some of which lie nearly 3 miles in offing, and from the distance have the appearance of houses. Unless absolutely necessary, it will be prudent to give this part of the coast a berth of 5 or 6 miles, especially at night, when it should not be approached within 36 fathoms at low water, with a bottom of gray sand mixed with small pebbles of various colours resembling nuts.

When it blows hard on a weather tide, a berth of at least 2 miles should be given to the north coast of Bas isle, to avoid crossing a sort of race produced by the uneven bottom extending from the northern shore of that isle.

TIDAL STREAMS.—Between Bas isle and the isle of Ouessant the flood stream sets east and the ebb west. In the offing the flood turns about $2\frac{1}{2}$ hours after the time of high water at Porsal, which, at full and change, is about 4 h. 0 m.

Ile de Siec.—This islet, which lies S.W. $\frac{1}{2}$ W. $2\frac{1}{2}$ miles from the west extreme of Bas isle, is half a mile long E.S.E. and W.N.W., and as it is connected with the land by a rocky ledge, which uncovers at low water, forms an excellent anchorage completely out of the tide; it is much frequented by coasting vessels, with the wind from N.E. round easterly to S.S.E. Approaching the anchorage from the westward, bring the spire of St. Pol de Léon college in line with the Querelevran rock, which lies one cable south of the west point of the isle, and when Golc'hedec rock, lying 2 cables N.W. of the isle, bears N.N.E. about 4 cables distant anchor in 5 to 6 fathoms, sand. Coming from the northward, bring the tower of Cleder church in line with the eastern point of the entrance of port Nevez S.W. by S., this line will pass 3 cables west of Golc'hedec rock, and when the former leading marks come on steer in for the anchorage.

Grève de Goulven.—This deep sandy bay, lying W. $\frac{1}{4}$ S. $10\frac{1}{4}$ miles from the lighthouse on Bas isle, affords shelter from westerly winds to vessels that can take the ground, but it is difficult of access, its entrance being full of rocks.

PORT de PONTUSVAL, the entrance to which is $1\frac{1}{4}$ miles to the westward of the Grève de Goulven, is the only place on this part of the coast where the crew of a vessel, driven on lee shore, could hope to be saved. It will berth a large number of coasters, but the bottom is hard, and in strong gales from the northward it is not an unfrequent occurrence to see them wrecked at their anchors.

The port completely dries out as far as abreast the western entrance point, and thence the bottom gradually rises to the head of the port. A vessel will be well sheltered on the eastern side of the port in a little bay named La Chambre, in which the bottom dries $13\frac{1}{2}$ feet above the lowest tides. The least depth at low water in the entrance channel, until abreast the western entrance point, is 13 feet, but as the channel is bordered on both sides by sunken rocks and crossed obliquely by the tidal streams, it would not be safe to enter without a pilot, and then only with a fair wind.

A Life Boat is stationed at this port.

LIGHT.—On Pontusval point, about a mile westward of the port stands a square lighthouse, whence from an elevation of 59 feet above high water is exhibited a *fixed* white light, visible from a distance of 10 miles.

Directions.—To enter port Pontusval, when about half a mile from the entrance steer to the southward with the beacon erected on the eastern shore of the port (to the eastward of the custom-house office), exactly in line with the steeple of Plounéour church, S. by W. $\frac{2}{3}$ W. This mark will lead between two rocks, named Blanche de l'entrée and An-Neuden, only one-third of a cable apart; the former is on the western side of the entrance, and its summit is always above water; the latter, which has a beacon on it, is on the eastern side, and uncovers $12\frac{1}{2}$ feet at the lowest tides. When abreast the Blanche de l'entrée, steer a little more to starboard, to pass nearly midway between the Blanche du centre and Vran rocks; the former lies on the western side of the channel, and never covers; the latter on the eastern side, and uncovers 27 feet. Pass rather nearer the Blanche than the Vran, and when near the Blanche du dedans, a rock lying a cable to the south-west of Blanche du centre, steer for the above custom-house office on a S. by W. $\frac{2}{3}$ W. bearing, and it will lead into La Chambre, on the eastern side of the port.

Tides.—It is high water, full and change, in port Pontusval at 4 h. 25 m., and the tide rises in La Chambre (on the eastern side of the port, where the bottom dries $13\frac{1}{2}$ feet above the level of the lowest tides), about $16\frac{1}{2}$ feet at equinoctial springs, and 5 feet at neaps.

ILE VIERGE LIGHT.—Vierge isle, lying W. by S. $2\frac{1}{2}$ miles from the western point of Corréjou bay, and 2 miles to the eastward of the entrance to the river Abervrac'h, may be recognized from some distance by a square light-house erected 109 yards from its eastern extreme.

The lighthouse exhibits, at an elevation of 108 feet above high water, a *fixed* white light varied every *four minutes* by a *red flash*, preceded and followed by a short eclipse. The light, which is of the third order, is an excellent guide for the entrance of Corréjou bay and for the entrance

of the river Abervrac'h, and is visible in clear weather from a distance of 14 miles; the eclipses do not appear total within the distance of 6 miles.

BAIE de CORREJOU.—From port Pontusval the coast trends $7\frac{1}{2}$ miles westward to Corréjou bay, which is fronted by three extensive ledges, named Plateau d'Aman ar Ross, Plateau du Guern, and Plateau du Lizen Ven, the outer parts of which are $2\frac{1}{2}$ miles from the shore. Penenès isle lies in the northern part of the bay, and close to the north-east of the isle is Penvers ledge, which covers at high water, with the exception of three heads, one at its south, the second at its east, and the other at its north extreme. A short distance eastward of its eastern head is the north-west extreme of the Bazughen ledge, which thence trends a quarter of a mile in a south-easterly direction, its highest head uncovering 10 feet at the lowest tides. The Garrec-Crom ledge, lying to the northward of the Bazughen, covers at high water, with the exception of one head at its eastern extreme.

The anchoring ground in this bay is to the south-east of Penvers ledge, and the depth on it is from 13 to 19 feet at low water. The beaching place is to the southward of Penenès isle; the bottom here is composed of sand, and gradually rises towards the coast, at the foot of which it dries 16 feet above the lowest tides.

Directions.—Corréjou bay may be entered by two channels, named Chenal Oriental and Chenal Occidental; the former or eastern channel lies between the Guern ledge and a ledge named the Chaussée de Carrec-Hir; the latter or western channel between the coast and the southern part of the Lizen-Ven ledge.

To enter the bay by the western channel, steer to the southward with the lighthouse on Vierge isle on a S. by W. bearing until the guard-house of Kerisoc is in line with the southern head on Penvers ledge S.E. $\frac{1}{2}$ E. Follow this latter direction until the little steeple of Tremeneac'h church opens to the eastward of the western point of the bay, when steer more to the eastward and pass between Penvers ledge and that of Garrec-Crom, keeping nearer the former than the latter to avoid a 4-feet patch lying nearly in mid-channel, and also keeping the northern point of the bay open to the northward of Penvers ledge to clear the Bazughen. Do not haul to the southward for the anchorage in the bay before the highest head on the Garrec-Crom is to the northward of N.N.E., for the south-east head of the Bazughen bears S.S.W. from this head; and in steering to the southward the highest head of the Garrec-Crom must not be brought more easterly than N. by E. $\frac{1}{2}$ E. so long as the southern head on the Penvers ledge is shut in to the southward of the north point of the bay.

The leading mark through the eastern channel is the steeple of Ploguerneau church kept on a S.S.W. $\frac{3}{4}$ W. bearing, when it will be in line with the Mean-Yan rock, which lies on the south-east ledge of the Guern ledge, and uncovers 23 feet. This mark will lead in not less than 7 fathoms at low water until the vessel is about $1\frac{1}{2}$ cables from the Mean-Yan, when steer a little to port to pass eastward of it. After clearing the south-east edge of the ledge, get the leading mark on again and it will lead close to the westward of the Garrec-Crom, when proceed as before.

L'ABERVAC'H.—The entrance to this river, situated 4 miles westward of Corréjou bay, affords good shelter but is difficult of access, being much encumbered by numerous shoals, islets and rocks. The outer anchorage is just within the entrance, and about $1\frac{1}{2}$ cables south-east of the beacon on the Petit-Pot-de Beurre rock, and carries from 6 to 8 fathoms at low water over a sandy bottom. The inner anchorage trends $1\frac{1}{2}$ miles in a S.S.E. $\frac{1}{4}$ E. direction from the outer anchorage, and the least depth in it is 5 fathoms, except $1\frac{1}{2}$ cables to the north-east of Cezon isle, where there are only $2\frac{1}{2}$ fathoms. There are two beaching places on the left bank of the river, one in Anges bay, southward of the inner anchorage, and the other a little farther eastward in a small inlet, named St. Antoine bay. The bottom in both bays is soft mud, and dries $6\frac{1}{2}$ feet above the lowest tides.

A Life Boat is stationed at Vrac'h isle.

LIGHTS.—The entrance to Abervac'h river is facilitated at night by the following lights:

A *fixed* white light shown on the eastern side of the entrance from a white tower, 36 feet high, erected on the southern part of Vrac'h isle. This light, of the fourth order, is elevated 59 feet above high water, and in clear weather is visible from a distance of 7 miles.

A *fixed* white light from a white rectangular tower on Lanyaon heights, which bears S.E. by E. $\frac{1}{4}$ E., $1\frac{3}{4}$ miles from the tower on Vrac'h isle. This light, of the fourth order, and elevated 170 feet above high water, is visible through an arc of 22° and from a distance of 12 miles, and when in line with the above light leads through the Grande channel to the entrance of the Abervac'h.

Two *fixed* lights, of the fourth order, are exhibited on the left bank of the river, one *white*, at the head of St. Antoine creek, and the other *green*, on the east point of Palue beach, and when in line they show the direction of the inner anchorage. These lights elevated respectively 49 and 29 feet above high water, are visible 4 and 3 miles.

Life Boat.—A life boat is stationed at Vrac'h isle.

Directions.—The Abervac'h river can be entered by two channels, one, named the Chenel de la Malouine, leading in from the northward

between Malouine and Pendante ledges, and the other, the Grande Chenal, leading in from westward, to the southward of Libenter ledge. There is a third channel between this latter edge and the Pendante, but its navigation is difficult and should not be attempted without a pilot.

Molouine channel is very narrow and can only be used by small vessels with a leading wind. A beacon erected on the shore of a little beach, named Grève Blanche, kept exactly in line with Petite Ile de la Croix, S. by W. $\frac{3}{4}$ W., will lead through, in not less than 20 feet at low water, up to the beacon on the Petit-Pot-de-Beurre, which can be passed on either side.

The Grand channel is practicable for vessels of large draught with a fair wind, and wide enough for coasters to turn through. In approaching it from the westward, bring the steeple of Plouguerneau church in line with the white light tower on Vrac'h isle (or at night the *white* and *red* lights in line), S.E. by E. $\frac{1}{4}$ E., directly they are seen; but when coming from the northward, the steeple of Ploudalmezeau church must be kept well open westward of the steeple of Lampaul church S.S.W., until the above leading mark is on, in order to pass westward of the western patches on Libenter ledge; there is never less than 25 feet on these patches but a heavy sea runs over them in bad weather.

In running through this channel, the above leading mark must be kept exactly on, for although the vessel will pass $1\frac{1}{4}$ cables southward of the south extreme of Libenter ledge, which is marked by a black buoy, and about the same distance southward of the Grand-Pot-de-Beurre ledge, yet it will only lead a little northward of a $9\frac{1}{2}$ feet patch, named Basse du Chenal, and 80 yards southward of the beacon on the Petit-Pot-de-Buerre, which at night may not be seen. Having passed this beacon, the vessel can come-to in the outer anchorage, or proceed to the southward with the light tower in St. Antoine bay in one with that on Palue beach, (or at night the *white* and *green* lights in line), S.S.E. $\frac{2}{3}$ E. This being the line of direction for the inner anchorage a berth may be taken as convenient, mooring N.W. and S.E., or if capable of taking the ground, the vessel can steer for one of the beaching places.

Tides.—It is high water, full and change, at the entrance of the river Abervrac'h, at 4h. 14m.; equinoctial springs rise 29 feet, ordinary springs 22 feet, ordinary neaps 16 feet, and neaps range 10 feet.

ROCHES de PORSAL.—The body of this extensive ledge lie 5 miles westward of the entrance to the Abervrac'h and the greater part of the rocks on it are covered at high water. The shoal patches on the outer part of the ledge extend nearly 3 miles, and the rocks that uncover $1\frac{1}{2}$ miles from the coast. There is anchorage amongst them, but the navigation is too intricate without a pilot.

Le FOUR is a remarkable large black rock, broad at the top and 17 feet high, lying N.W. about a mile from Melgorne point, the north-west extreme of the coast of France, and E. $\frac{1}{2}$ S. $10\frac{1}{4}$ miles from Ushant north-east lighthouse.

LIGHT.—From a lighthouse 92 feet high on the Four rock, is exhibited at an elevation of 79 feet above high water a *fixed* and *flashing* light showing a *fixed* white light during *thirty seconds*, and a *flashing* light of *eight* distinct flashes, followed by eclipses, during *thirty seconds*; thus the light will be alternately *fixed* and flashing; and should be visible in clear weather from a distance of 15 miles.

Fog Trumpet.—During foggy and thick weather, a steam trumpet sounds a blast of *five seconds* duration, followed by an interval of silence of *twenty seconds*.

CAUTION.—The coast in the vicinity of the Porsal and the Four rocks is of middling height, but being bordered by numerous dangers it should not be approached at night or in thick weather within the depth of 45 fathoms at low water; the bottom will generally be of grey sand mixed with flint and other stones.

LABERILDUT.—This tidal port lies S. $\frac{1}{2}$ E. $3\frac{1}{2}$ miles from the Four rock, and is the only place between Brest and the river Abervrac'h, where vessels drawing 13 to 14 feet can enter at high water, spring tides, and be perfectly sheltered from all winds. The port dries completely out as far as 2 cables from the entrance, but the bottom being composed of soft sand vessels lie aground with great safety. This place is much frequented by the Brest pilots and fishermen from the adjoining coast; a considerable trade is also carried on, the principal exports being stone and sand; a great deal of the stone used in the embankment of the Thames came from here.

Directions.—To enter Laberildut, when about 2 miles off the entrance, bring the tower of Brélès church (situated amongst the trees about 2 miles inland) in line with the tower of Lanildut church; this mark will lead up to the entrance, passing about one cable to the northward of the Pierre de Laber rock, which uncovers 12 feet at low water and is marked by a beacon, and close to the southward of the Men-Garo rock, which only covers at the equinoxes. On arriving at the entrance, which is only about 150 yards wide, pass about 50 yards to the southward of a black rock lying on the left side of the entrance, run on, keeping about 50 or 60 yards from the northern shore, and on rounding the point which forms the western side of the port of Laber, if only having come in for shelter, anchor when abreast of the first houses in that village, but if going to take in or discharge cargo proceed on up to the quay, where the grounding places are

excellent, the bottom being sand and mud. The tide runs very strong to the S.W. across the entrance during the first hour of the ebb, requiring a fresh breeze to stem it. It would be advisable for a stranger to take a pilot, and although there are no pilots specially belonging to the port, the fishermen do equally as well.

Tides.—It is high water, full and change, in Laberildut at 3h. 58 m., and the tide rises above the grounding places off Laber (where the bottom dries about 9 feet at the lowest tides) 16 feet at ordinary springs, and 9½ feet at neaps.

USHANT, or ILE D'OUessant of the French, lies 10½ miles westward of the north-west extreme of the coast of France. It is about 4½ miles long, W. by N. and E. by S., about 2 miles wide, and its highest part, which is the north-east, 195 feet above the level of the sea. In fine weather the island is visible from a distance of from 15 to 20 miles, the outline appearing rugged and uneven, being composed of high, craggy, and precipitous rocky cliffs of granite formation. There are two light-houses on the island; one on the north-east extreme, the other at the north-west.*

The inhabitants, about 2,500 in number, are chiefly employed in rearing cattle, and as fishermen, many of whom are well acquainted with and can act as pilots for the passages in the vicinity, rendered dangerous by the numerous hidden as well as apparent rocks and islets lying between the island and the main land. The people, generally, speak pure Breton.

The only village is called Lampaul or Portspaul, situated at the bottom of a bay on the south-west side, it is here that the pilots reside. In the other parts of the island the houses are scattered, forming only small hamlets. A post-boat sails twice a week for Conquet on the main land, at which place the produce of the island, consisting of soda, grain, sheep, and poultry is disposed of.

Supplies.—Wood is scarce, but water and other supplies can be obtained in moderate quantities; for fuel the natives find a substitute in dried seaweed.

LIGHTS.—**North-east Light.**—A conspicuous lighthouse, 85 feet high, stands near the north-east extreme of Ushant, from which at an elevation of 272 feet above high water, is exhibited a *fixed* white light, of the first order, visible in clear weather from a distance of 18 miles.

North-west Light.—On Creac'h point, at the north-west extremity of the island, is a circular tower, with black and white horizontal stripes, whence, at an elevation of 223 feet above high water, is exhibited a *re-*

* See Admiralty chart:—Channels between Ile d'Ouessant and the mainland, No. 2,694; scale, $m = 1\cdot5$ inches.

volving light, the eclipses of *twenty seconds* duration, being succeeded by *one red* and *two white* faces, each lasting twenty seconds, and visible in clear weather 22 miles.

Fog Trumpet.—At the west point of the island of Ushant, during foggy weather, a fog trumpet will be sounded at intervals of *ten seconds*, the duration of the blast being *two seconds*. The sound will generally be heard 3 miles in calm weather.

A Life Boat is stationed at Creac'h point.

Semaphores.—By using the Commercial Code of Signals, passing vessels can communicate with either the semaphore on Creac'h point, or that on the N.E. point, and by this means telegraphic messages may be sent to all the countries of Europe.

Baie de Beninou.—Ouessant is surrounded by dangers except between its north extreme and Keller isle, where there is good shelter in 7 to 12 fathoms water, sand and rocky bottom in Béninou bay, during southerly winds, but quite exposed to the northward.

Chaussée de Keller.—At 2 miles N.N.E. $\frac{3}{4}$ E. of the west extreme of Ouessant, and 3 miles N.W. by W. $\frac{1}{2}$ W. of the north-east lighthouse, is a small patch of 11 fathoms, (with 21 to 28 fathoms close around) named Basse Callet, at the west extreme of Chaussée de Keller the name given to a chain or causeway of rocks extending N.W. by W. $1\frac{1}{4}$ miles from the western part of Keller isle. The marks for the 11 fathoms are, the lighthouse in line with Keller, S.E. by E. $\frac{1}{4}$ E., and Bélanger mill (the most westerly mill of Ouessant) in line with the west end of Callet rock, S. by E. $\frac{3}{4}$ E.

Baie du Stiff, on the north-east side of Ouessant, affords temporary anchorage for small vessels, but it is open to the eastward. The dangers to be avoided on entering are, the Men-Corn, Douellau rocks, and Lígounec bank, lying off its southern point, and the Gorlé-bian rock in the middle of the bay; the former and latter uncover at half tide. The Men-Corn* and Gorlé-bian rocks are both marked by stone beacons.

Baie du Lampaul is the port of Ouessant, but being situated on the south-west side of the island it is exposed to the whole force of south-westerly winds. The bay is only used by small vessels, although the water in it is deep over a sandy bottom, which shoals gradually towards its head, thus rendering the anchors less liable to drag with a westerly wind. A high rock, named the Corce, the summit of which never covers, lies in the middle of the bay.

The dangers to be avoided in entering this bay are the Jument rock; a ledge named the Basse Bridy, and the Leurvas rocks. The Jument rock, which uncovers 19 feet at the lowest tides, lies S.W. $\frac{3}{4}$ W. $1\frac{1}{4}$ miles from the

* Men-Corn beacon destroyed during a gale, 1881.

southern horn of the bay, in the direction of Bélanger mill open a quarter of a point to the eastward of the Corce rock, N.E. $\frac{1}{2}$ E.

Ouessant north-east lighthouse kept a little open to the northward of the Corce will lead into Lampaul bay, between the Bridy ledge and the Leurvas rock, the former lying West $1\frac{1}{2}$ miles from the beacon on Runion point the south extreme of Ushant, and the latter W.S.W. a long half mile from the northern horn of the bay. The best anchorage is in 12 to 7 fathoms over a sandy bottom, to the north-west of the Corce, which may be rounded close to on all sides, but it will be better to pass eastward of it.

Tides.—It is high water, full and change, around the isle of Ouessant at 3 h. 32 m.; ordinary springs rise $19\frac{1}{4}$ feet, neaps $13\frac{3}{4}$ feet. Off the north-west coast of the island the flood sets to the N.E., the ebb to the S.W.

CHANNELS between the OUessant and COAST.

Nearly the whole space between Ouessant and the Four rock is studded with islets, rocks, and shoals, particularly in the direction of St. Mathieu point, which bears S.S.E. $\frac{1}{2}$ E., nearly 15 miles from Ouessant lighthouse. There are three deep channels, named Chenal du Four, Chenal de la Helle, and Passage du Fromveur, lying between these dangers; but only the latter should be taken by a stranger on account of the sunken rocks, lying nearly in the fairway of the two former, and also of the tidal streams, which, at the springs, run $4\frac{1}{2}$ knots, the flood setting to the northward.*

Chenal du Four.—The northern entrance to this channel is about 3 miles W.N.W. of the Four rock, and the leading mark through is the lighthouse on Kermorvan point in line with that on St. Mathieu point, bearing South. When within half a mile of the former point the vessel should be hauled out a little, to pass westward of the point between the Petite and Grande Vinotière rocks; but thence the navigation of the southern part of the channel becomes more difficult, on account of the Renards and Chenal patches, and the Vieux Moines and Bossemen Or rocks.

Chenal de la Helle lies westward of the Four channel, from which it is separated by a rocky ledge, three-quarters of a mile long north and south, named the Platrésées. The direction of this channel is N.N.W. and S.S.E., and it unites with the Four about $1\frac{3}{4}$ miles to the northward of Kermorvan point.

Passage du Fromveur, formerly called the Ushant or St. Vincent channel, runs parallel with the south coast of Ouessant, along which are several rocks and rocky patches, but none extend more than half a mile from the shore. The principal danger lies on the southern side of the

* See Admiralty chart of Brest roadstead, No. 2,690; scale, $m = 1\cdot5$ inches.

channel, off the broken rocky isle of Loédéc, from which a rocky ledge extends nearly half a mile W. by N. $\frac{1}{4}$ N., and at its extremity is Men Tensel, a detached rock, which uncovers 13 feet at the lowest tides. Most of the rocks on this ledge, however, are visible at half ebb, and there is generally broken water over them at other periods of the tide; but care must be taken to avoid a sunken rock with only 12 feet over it, lying about $1\frac{1}{4}$ cables to the north-west of the Men Tensel. The streams take the direction of the channel, about E. by N. and W. by S., but they are so rapid as to alarm any persons unused to its navigation, particularly at springs, when the whole surface of the water has the appearance of breakers.

Directions.—When bound through Fromveur channel from the north-eastward, round the east end of Ouessant, when about a mile distant, and this end is in line with the north-east lighthouse, N.N.W. $\frac{3}{4}$ W., and the Loédéc rock is nearly in one with Bannec isle about S. by W. $\frac{1}{4}$ W., steer W. by S. $\frac{1}{4}$ E. for 6 miles, or until the south end of Bannec bears about E. $\frac{1}{4}$ N., and the west end of Ouessant N. by E. $\frac{3}{4}$ E.; when, if bound to Brest a S. by E. $\frac{1}{4}$ S. course, uninfluenced by the tide, for 11 miles, will lead westward of the Pierres Vertes, the highest of which uncovers 7 feet at the lowest tides, and also of the westernmost patch of the Pierres Noires, on which there are 13 feet at the same period. A course can then be steered towards the Goulet de Brest with the lighthouse on Petit Minou point, in line with the lighthouse on Portzic point, bearing East.

TABLE showing the Rise, at full and change, above the Level of the lowest Tides, in the different Harbours on the Coast of FRANCE, from the Isle of Ouessant to DUNKERQUE, and amongst the CHANNEL ISLANDS. Those places denoted by an * show the rise above the Grounding places.

Name of Place.	H. W. Full and Change.	Equinoctial Tides.	Ordinary Springs.	Ordinary Neaps.
	H. M.	Feet.	Feet.	Feet.
Ouessant or Ushant isle - - - -	3 32	—	19½	13½
Port Laberildut* - - - -	3 58	—	16	9½
Aberwrach river (entrance) - - -	4 14	29	22	16
Port Pontusval* - - - -	4 25	16½	—	5
Bas isle - - - -	4 49	30	23	17
Morlaix Road - - - -	4 53	31	24	18
Tréguier river (entrance) - - -	5 22	35	25	18½
„ „ (town)* - - - -	5 32	—	23	14½
Les Héaux lighthouse - - - -	5 45	39	31	23½
Bréhat isle - - - -	5 51	39	31	23½
Port Paimpol* - - - -	6 0	19	13	—
„ Portrieux* - - - -	6 0	26	19	10
„ Binic* - - - -	6 3	21	15	6
„ Dahouet* (western part of quay) -	6 5	20	16	6
Erqui road - - - -	5 59	43	33½	24½
Ehbiens isle - - - -	6 0	42	35	26
Port St. Malo* (large opening into port, converted into a lock).	6 5	32	25	14
St. Malo road - - - -	6 5	44½	35	26
Minquiers rocks - - - -	6 6	47	35	26
Chausey isles - - - -	6 9	46	35	26
Port Granville* (sill of floating basin) -	6 13	39	32	20
„ „ anchorage of - - -	6 13	48	37	27½
Guernsey* (entrance to St. Pierre harbour) -	6 37	30	25½	14
Casquets islets - - - -	6 45	24	15½	10
Alderney (Braye bay) - - - -	6 46	20	17½	12½
Jersey (St. Aubyn bay) - - - -	6 21	42	36	19½
„ (St. Helier outer harbour) - - -	6 29	—	31½	23
„ „ „ *inner harbour) - - -	—	—	21	12

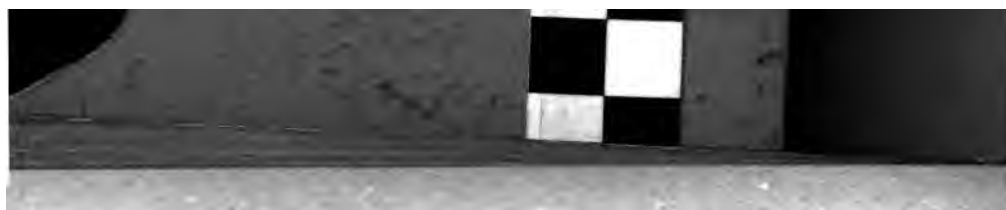


Tide Table—continued.

Name of Place.	H. W. Full and Change.	Equinoctial Tides.	Ordinary Springs.	Ordinary Neaps.
	H. M.	Feet.	Feet.	Feet.
Cape de la Hague - - - - -	7 6	26½	21½	18
Cherbourg road - - - - -	7 49	22	19	14½
„ (Port du Commerce,* sill of floating basin). - - - - -	7 49	20	17	13
Port Barfleur* (north quay) - - - - -	8 59	19	16½	9½
Barfleur road - - - - -	8 59	24	17	13½
St. Vaast Harbour* - - - - -	8 42	18½	13½	9½
Port de la Hougue* (abreast the fort) - - - - -	8 42	16½	14½	8
„ „ road - - - - -	8 42	24	18½	14½
Port-en-Bessin* - - - - -	8 57	26	20	15½
Port Courseulles* - - - - -	9 7	26	20	15½
River Orne* (entrance) - - - - -	9 38	18½	16½	7½
„ „ (outside the banks) - - - - -	—	26	24	15
River Dives* (entrance) - - - - -	9 39	18½	16½	7½
„ „ (outside the banks) - - - - -	9 39	26	21	16
Port Honfleur* - - - - -	9 29	21	19	13
„ „ (outside entrance channel) - - - - -	—	27	23	18
Le Havre* - - - - -	9 51	28½	21½	15½
„ (outside entrance channel) - - - - -	9 18	26½	22	18
Fécamp harbour* - - - - -	10 44	25	23½	18
St. Valéry-en-Caux harbour* - - - - -	10 46	19½	17½	8½
„ „ „ (outside entrance channel). - - - - -	—	30	27	21½
Port Dieppe* (bar) - - - - -	11 6	28	25½	19
„ „ *(quay) - - - - -	11 6	25	22½	16
Tréport* (bar) - - - - -	11 9	21	14	8
„ (outside bar) - - - - -	11 2	34	27	21
Cayeux - - - - -	11 5	33½	27½	21
River Somme (Houedel harbour*) - - - - -	11 26	22½	20½	10
„ „ (St. Valéry-sur-Somme harbour*) - - - - -	11 46	20½	17½	8
„ „ (Port Crotoy*) - - - - -	11 26	17	15	4
River Canche* (entrance channel) - - - - -	11 20	19½	17½	10
„ „ (Étaples*) - - - - -	—	—	14½	9
Port Boulogne (steam vessel quay*) - - - - -	11 25	23	21	13
„ „ (outside entrance) - - - - -	11 25	29½	25	19½
Cape Gris-Nez - - - - -	11 27	27	21½	16½
Port Calais - - - - -	11 49	22	19½	15½
Port Gravelines* (bar) - - - - -	12 0	18	16	10½
Port Dunkerque - - - - -	12 8	22	16½	13½

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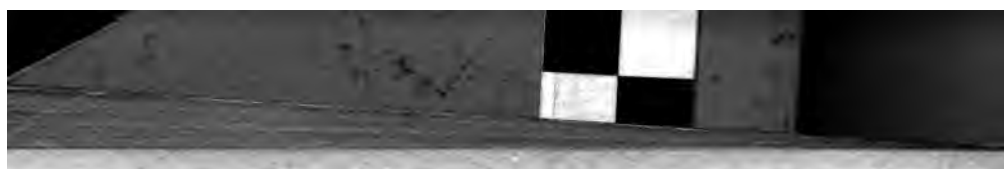


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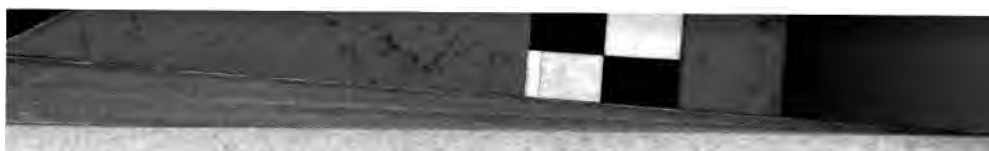


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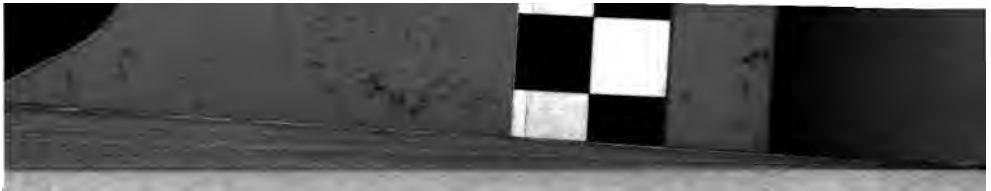


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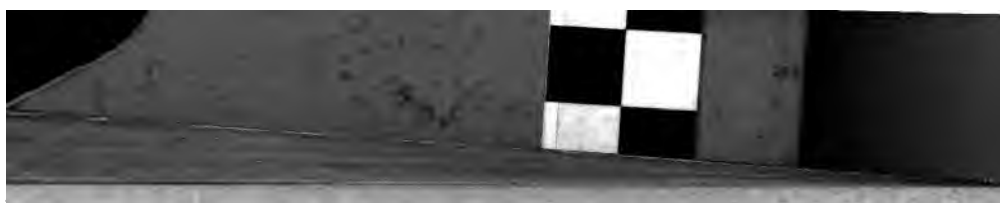
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